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TWINCVI3

V 1.5.2.X

User manual

CONTENTS

1 - SAFETY AND STATEMENT OF USE....7

1.1 - Statement of use 7
1.2 - General instructions 7
1.3 - Personal safety..... 7
1.3.1 - Differential circuit breaker 7
1.3.2 - Power consumption..... 7
1.3.3 - Power supply..... 7
1.4 - Tool use hazards 7
1.5 - Tool care and service 7

2 - GETTING STARTED.....8

2.1 - Front panel 8
2.2 - LEDs color code..... 8
2.3 - Bottom panel 8
2.4 - On receiving the controller 9
2.5 - Installation 9
2.6 - Changing the controller language 9

3 - TREE VIEW.....10

3.1 - Main menu / Configuration 10
3.2 - Main menu / Maintenance..... 10

4 - CONTROLLER SETTINGS 11

4.1 - Using icons and keyboards 11
4.2 - Display.....11
4.3 - Date & time.....11
4.4 - Access manager..... 12
4.5 - Workgroup..... 12
4.5.1 - None (stand-alone) 12
4.5.2 - Primary controller..... 12
4.5.3 - Secondary controller 13
4.6 - Serial / USB..... 13
4.6.1 - Serial ports 13
4.6.2 - USB..... 13
4.7 - Networks 13
4.8 - Fieldbus..... 13
4.9 - Customized protocol..... 14
4.10 - CVINet..... 14

5 - TIGHTENING UNIT MANAGEMENT... 16

5.1 - Asynchronous operating mode..... 16
5.2 - Synchronous operating mode 16
5.3 - How to change the operating mode 16
5.4 - General..... 17
5.4.1 - Asynchronous mode 17
5.4.2 - Synchronous mode 17
5.4.3 - Master tool (in synchronous mode and for portable electric nutrunners only)..... 17
5.4.4 - Add a name and comment..... 17
5.4.5 - Pset selection source 17
5.4.6 - Options..... 17
5.5 - Run reverse parameters..... 18
5.6 - Options on "Reject report"..... 18
5.7 - Curves distribution..... 18

6 - TOOL CONFIGURATION 19

7 - PSET PROGRAMMING.....20

7.1 - Asynchronous mode - list of Psets..... 20
7.2 - Synchronous mode - list of Psets..... 20
7.3 - How to add a Pset..... 20
7.3.1 - Advanced Pset 20
7.3.2 - Simple Pset..... 20
7.4 - General..... 21
7.4.1 - Remove fastener torque limit 21
7.4.2 - Pset start torque..... 21
7.4.3 - Overall angle mode 21
7.4.4 - Overall time mode 21
7.5 - General 2..... 22
7.5.1 - External stop abort Pset..... 22
7.5.2 - Thread direction 22
7.5.3 - Pset start/stop 22
7.5.4 - Torque transducer offset and span check 22
7.5.5 - Reject on trigger lost 22
7.5.6 - Jog 22
7.5.7 - Rehit..... 23
7.5.8 - Socket release 23
7.5.9 - Ergostop..... 23

7.6 - Curves 23
7.7 - Pset coefficients 24
7.8 - How to copy / paste / delete a Pset 24

8 - STEP PROGRAMMING 24

8.1 - Asynchronous mode - list of steps 24
8.2 - Synchronous mode - list of steps 24
8.3 - How to add/organize the steps 25
8.4 - General 26
8.5 - Tightening 27
8.5.1 - Torque control 27
8.5.2 - Angle control 27
8.5.3 - Torque OR angle control 28
8.5.4 - Torque AND angle control 28
8.5.5 - Yield point control 29
8.6 - Monitoring & options 29
8.6.1 - Current monitoring 29
8.6.2 - Time monitoring 29
8.6.3 - Angle reset 29
8.6.4 - Torque reset 29
8.6.5 - Offset reset 29
8.6.6 - Latch threshold 29
8.7 - Motor control 30
8.7.1 - 2 speed 30
8.7.2 - 3 speed - ergospeed 30
8.8 - "External stop to next step" option 30
8.9 - Loosening 31
8.9.1 - Torque control and angle monitoring 31
8.9.2 - Angle control and torque monitoring 31
8.9.3 - Motor control - loosening 32
8.10 - Prevailing 32
8.10.1 - Forward prevailing 32
8.10.2 - Motor control - forward prevailing 32
8.10.3 - Prevailing parameters 33
8.11 - Synchro step 34

9 - ASSEMBLY PROCESS PROGRAMMING 34

9.1 - How to create an Assembly Process 34
9.2 - How to view the list of Assembly Processes ... 35
9.2.1 - Asynchronous mode 35
9.2.2 - Synchronous mode 35

10 - MONITORING 36

10.1 - Main screen 36
10.2 - Display change/Tool selection 36
10.3 - Report OK 36
10.4 - Report NOK 37
10.5 - Monitoring view menu 37
10.5.1 - Ellipse view (in Assembly Process running mode only) 37
10.5.2 - Simple view 38
10.5.3 - Simple view - prevailing step 38
10.5.4 - Detailed view 38
10.5.5 - Curve view 39
10.6 - "All tools" display 39
10.6.1 - Twin 39
10.6.2 - Multi 39
10.6.3 - Workgroup 40
10.7 - User info code 40

11 - RESULTS 41

11.1 - Main screen description 41
11.2 - Detailed view 41
11.3 - Filter 42
11.4 - Curve 42

12 - MAINTENANCE 43

12.1 - Controller 43
12.1.1 - USB key - Firmware upgrade 43
12.1.2 - USB key - Save 43
12.1.3 - USB key - Advanced diagnostic 43
12.1.4 - CVILOGIX 44
12.1.5 - Physical I/O configuration 44
12.1.6 - Event I/O programming 45
12.1.7 - Calibration of the controller screen 45
12.1.8 - Memory 46
12.2 - Tool 46
12.2.1 - Tool identification / characteristics 46
12.2.2 - Tool identification 46
12.2.3 - Tool characteristics (read-only) 46
12.2.4 - Tool configuration (read-only) 46
12.2.5 - Tool monitoring 47
12.2.6 - Transducer 47

12.2.7 - Temperature 47
12.2.8 - Tool counters 47
12.2.9 - Maintenance alarms 47
12.3 - ePOD 48
12.3.1 - Backup/Restore 48
12.3.2 - Eject 48
12.3.3 - Repair 48
12.3.4 - Erase results 48
12.4 - User information 49
12.5 - Hardware and firmware versions 49

13 - APPENDIX - CVI3 I/O AND EVENTS 50

13.1 - CVI3 logical outputs 50
13.2 - CVI3 logical inputs 54

14 - APPENDIX - USER INFO CODES 57

15 - APPENDIX - CVI3 CONNECTIONS .. 62

15.1 - Tool connector 62
15.2 - CVI II adaptor 62
15.3 - RS232 - SubD 9pt 62
15.4 - Digital inputs (0 – 24V) 63
15.5 - Digital outputs (0 – 24V) 63
15.6 - Synchronizing several CVI3 VISION controllers 64
15.7 - Synchronizing several TWINCVI3 controllers 64
15.8 - eBUS (for accessories) 65
15.9 - Workgroup 65

16 - APPENDIX - CVI3 SPARE PARTS 66

17 - APPENDIX A - CONTROLLER POWER CONSUMPTION: CURRENT INLET 68

18 - APPENDIX B - JVL6-32 RESIDUAL CURRENT CIRCUIT BREAKER WITH OVER-CURRENT PROTECTION 69

19 - APPENDIX - ePOD 70

Original instructions.

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1 - SAFETY AND STATEMENT OF USE

1.1 - Statement of use

This product is intended to be used to drive, monitor and control the following tools range:

- CVI3 tools
- CVI II tools providing they are equipped with the CVI II adapter.

No other use is permitted.

For professional use only.

1.2 - General instructions

To reduce risk of injury, everyone using, installing, repairing, maintaining, changing accessories on, or working near this tool must read and understand the safety instructions before performing any such task. Failure to follow all instructions listed below may result in electric shock, fire and / or serious personal injury.

- Refer to the following booklets:

- General safety instructions, part no. 6159931790
- Quick-start user manual, part no. 6159932290.

SAVE THESE INSTRUCTIONS CAREFULLY.

1.3 - Personal safety

WARNING: This power tool must be earthed. If the power tool is not earthed, the system will disable the power stage and the tool will not start. The error message "Bad tool ground" will be displayed.

1.3.1 - Differential circuit breaker

The controller has a residual current circuit breaker with over-current protection fitted with a differential circuit-breaker for user protection. Any insulation defect in the cable or in the tool is detected by this device.

The circuit breaker protects from a leakage current exceeding 30 mA in 50 µs by automatic power cutoff. The device protects the operator from any electric shock and protects, the controller from the deterioration. To make sure that the detection of leakage current is functioning properly, the device must be tested monthly by pushing the yellow pushbutton.

It also has a fuse function. It protects the system from any short-circuit by automatic power cutoff.

- Refer to Appendix B - JVL6-32.

The circuit breaker must be switched on to restart the controller.

1.3.2 - Power consumption

The decision to install an external differential circuit-breaker depends on the type of internal electric network in the customer's plant.

This device detects any insulation defect between one of the phases of the network and the earth, immediately stops the tool by automatic power cutoff and protects the operator from any electric shock.

Should circuit-breakers be installed at line head, we recommend that you select equipment with the following specifications:

- Single-phased 240V 16A - curve D
- Single-phased 110V 32A - curve D.

- Refer to Appendix A: Controller Power consumption: Current inlet.

For information:

- standby consumption is 17 W.
- the max power available supplied via the 24Volt power supply (between pin 2 and 3 on I/O connector):
  CVI3 Vision: 1 A (24V)
  TWINCVI3 : 2 A (24V).

1.3.3 - Power supply

- Only use the cord supplied with the controller to connect to the mains power supply.
- Do not modify the cord or use it for any other purpose.
- Only use genuine Desoutter replacement parts.
- Failure to follow these instructions may result in electric shock.

1.4 - Tool use hazards

The selection of the tool takes account of the operating conditions as stated by the user.

When selected, they must not exceed the operating limits as specified by the manufacturer.

Any excessive internal temperature of the tool electric motor is detected and stops the tool. The motor can start again only after the temperature has decreased.

Motor temperature limits are different for handheld tools and for fixed tools:

- 60°C for handheld tools.
- 100°C for fixed tools.

Although our cables are designed to work under drastic conditions, we recommend that you check the following points for a longer service life:

- Bending radius should not be lower than 10 times the cable diameter.
- Friction with the outer sheath should be restricted.
- Any direct pull on the cable should be avoided.

1.5 - Tool care and service

Only experienced and qualified personnel (authorized electricians) are entitled to open and have access to the inside of the controller.

- If in doubt, return the tool to a Desoutter-authorized service centre. Contact your Desoutter representative for support.
- Disconnect from power supply and wait one minute before starting service operations.

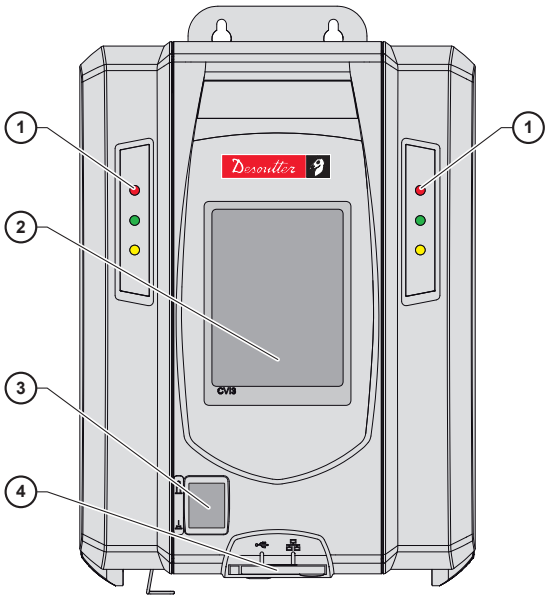
Failure to wait one minute may result in electric shock from not yet unloaded capacitors.

According to Directive 2002 / 96 / CE concerning Waste Electrical and Electronic Equipment (WEEE), this product must be recycled.

- Contact your Desoutter representative or consult the website "www.desouttertools.com" to find out where you can recycle this product.

2 - GETTING STARTED

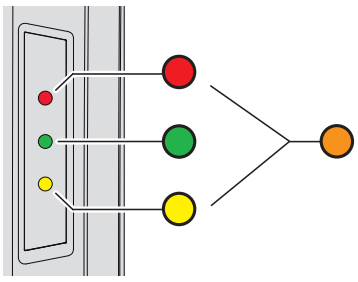
2.1 - Front panel



Legend

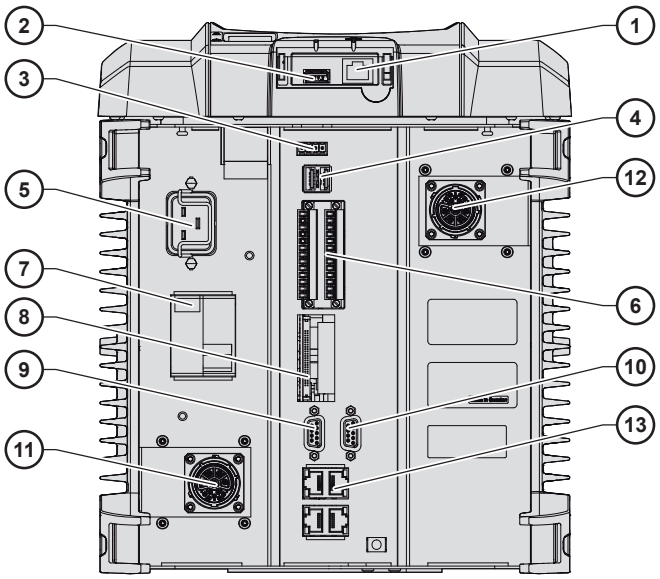
1 Report LEDs (channel 1: left, channel 2: right)
2 Touchscreen color display
3 On / Off switch
4 Dedicated PC software port + USB port

2.2 - LEDs color code



LED color	Designation	Action
Green	Accept report	-
Yellow	Incomplete rundown	Tighten again
Orange	Reject report	Loosen and tighten again
Red	Above High Angle	Remove and replace fastener.

2.3 - Bottom panel



Legend

1 Ethernet port dedicated only to PC software
2 USB port for data transfer / firmware updating / access control management
3 ePOD port for controller backup, memory extension, customer features activation, workgroup configuration.
4 2 USB ports to connect barcode readers
5 Auto-sensing input voltage mains connector
6 2x8 I/O connector dedicated to customer use + 2 quick stops.
7 Ground Fault Interruptor: earth fault and overcurrent protection
8 Fieldbus port for plug & play Fieldbus modules
9 eBUS to daisy-chain up to 15 accessories (e.g. socket tray)
10 RS232 port (2 serial ports) to connect: Barcode reader / Delta measuring unit
11 8-pin tool connector tool no.1
12 8-pin tool connector tool no.2
13 4 Ethernet ports for 1 or 2 networks:

1 network — • Plug the Ethernet cable into any port.

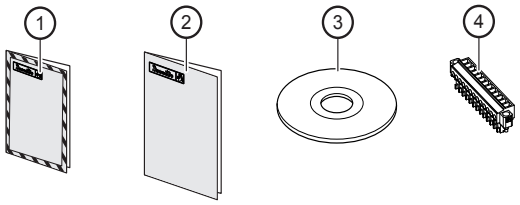
2 networks — Ethernet network 1; Ethernet network 2

- Refer to "Appendix - CVI3 connections" to get more information.

- For more information about installing Fieldbus modules, refer to the " Quick start user manual" part no. 6159931440 at **http://resource-center.desouttertools.com.**

2.4 - On receiving the controller

- Check the following items are included in the kit supplied with the controller.

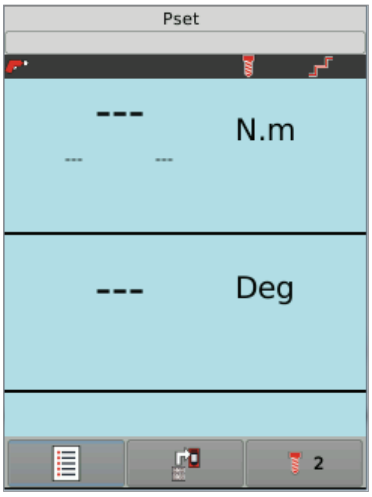


Legend
1 Safety booklet
2 Quick start user manual
3 CDROM with documentation and PC software
4 2 cable clamps

2.5 - Installation

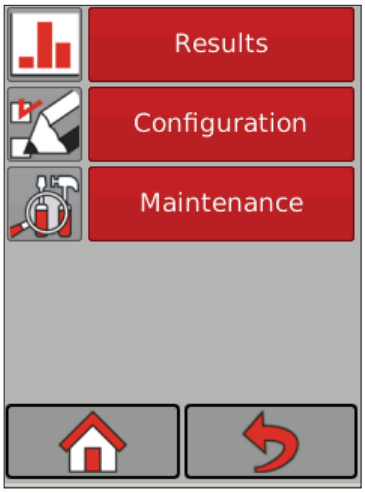
- Check the line voltage and power are compatible with your appliance: 100-120 V~ / 200-240 V~ single phase, with automatic switching voltage between 100-120 and 200-240 V~. Frequency is 50 / 60 Hz.
- To install and power the controller, follow the instructions listed in the Quick-start user manual 6159932290 supplied in the controller box.

The front panel LEDs are blinking and the Monitoring screen is displayed:



2.6 - Changing the controller language

- Tap this icon to display the main menu.

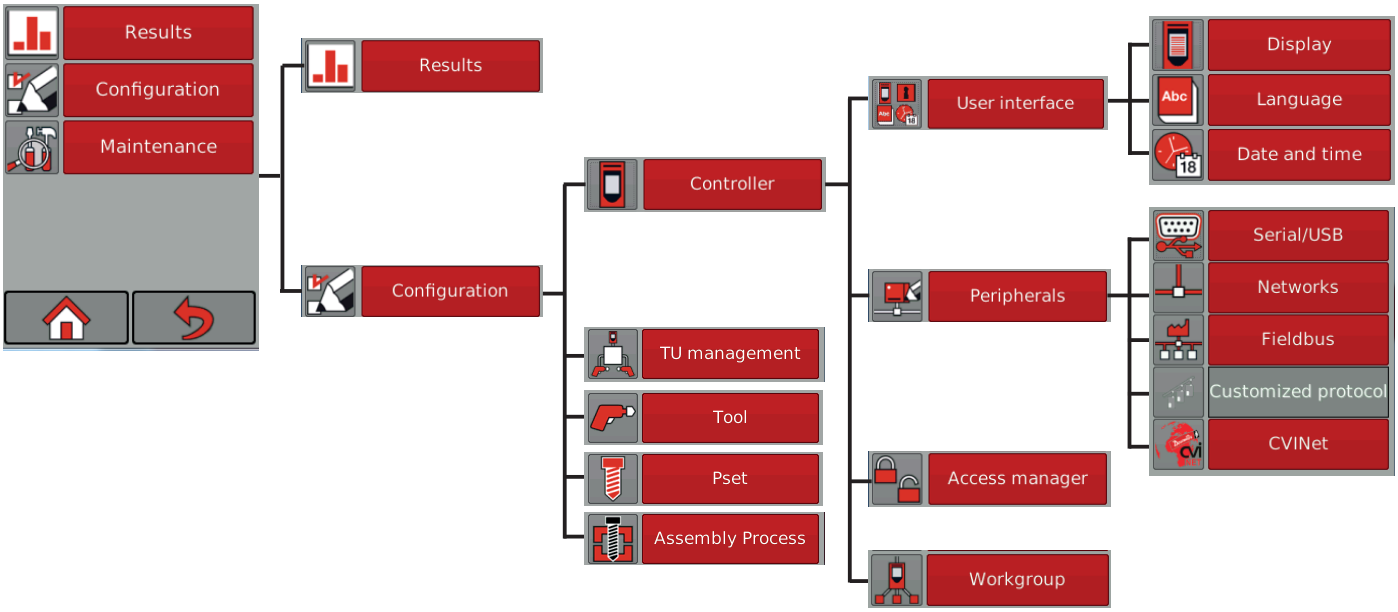


- Tap "Configuration / Controller / User interface / Language".

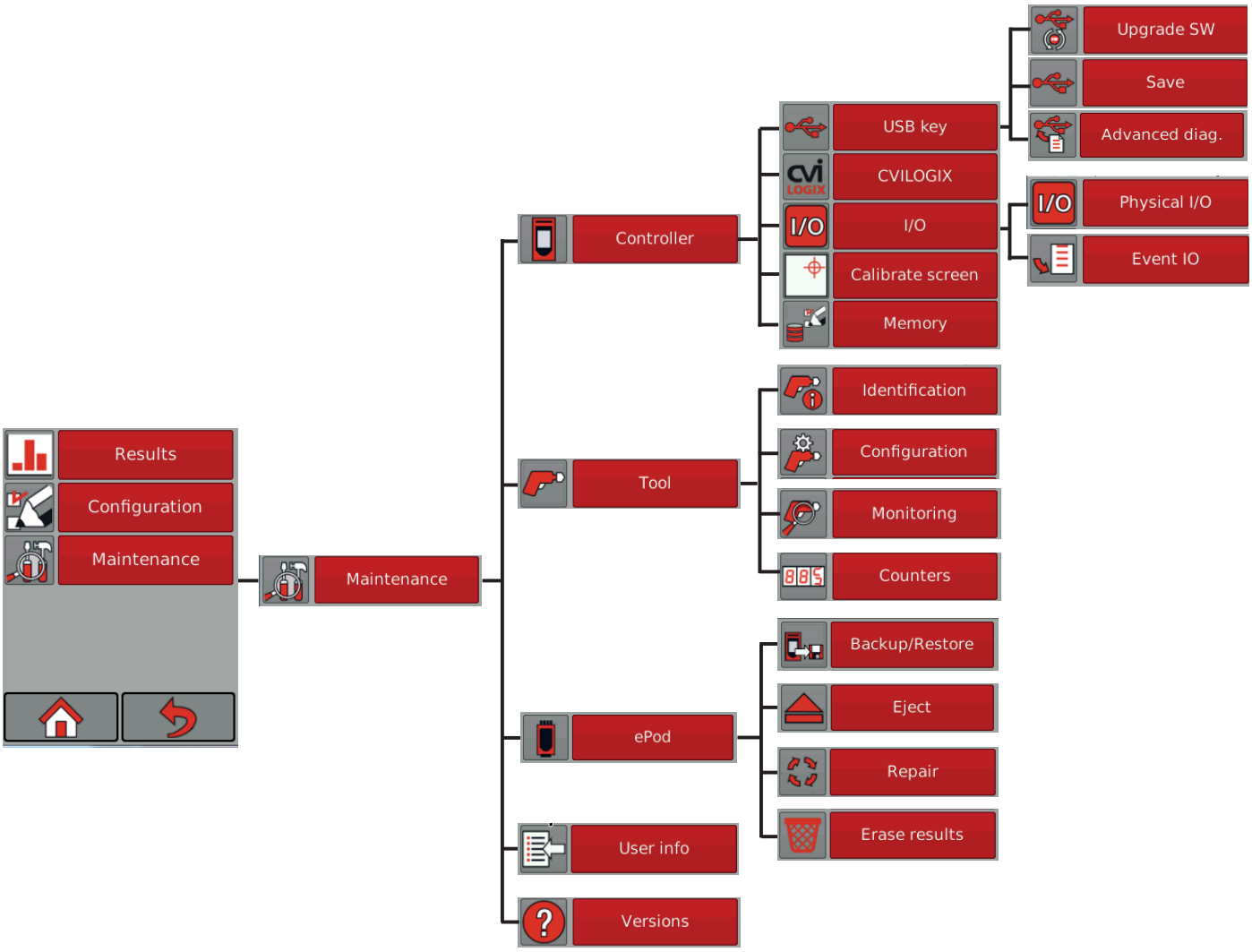
- Select your language by tapping the screen or the arrows.
- Tap the "Save" icon on the bottom right to save and quit the screen.

3 - TREE VIEW

3.1 - Main menu / Configuration



3.2 - Main menu / Maintenance

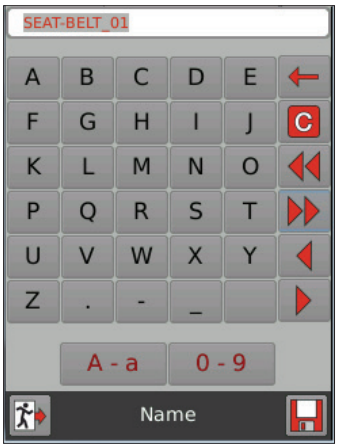


4 - CONTROLLER SETTINGS

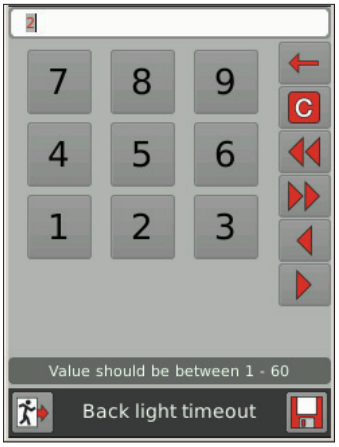
4.1 - Using icons and keyboards

	to quit and return to the Monitoring screen.	
	to display the main menu.	
	to display the Monitoring view menu.	
	to quit and return to the previous screen	
	to quit without saving	
	to save and quit	
	the screen is locked	• Refer to chapter "Access manager".
	the screen is unlocked	
	• Use the left, right or down arrow keys: - to navigate from one screen to another - to change the tool	

• Use the text keyboard to write and customize the texts.

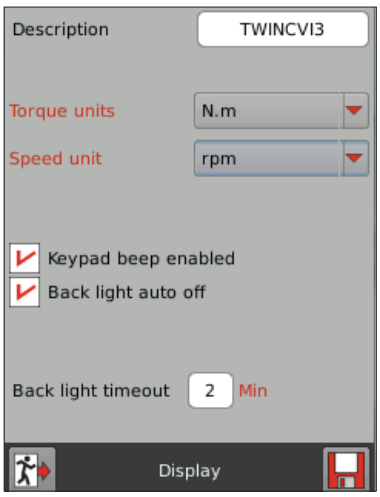


• Use the digital keyboard to enter the figures.



4.2 - Display

Path: Main menu / Configuration / Controller / User interface



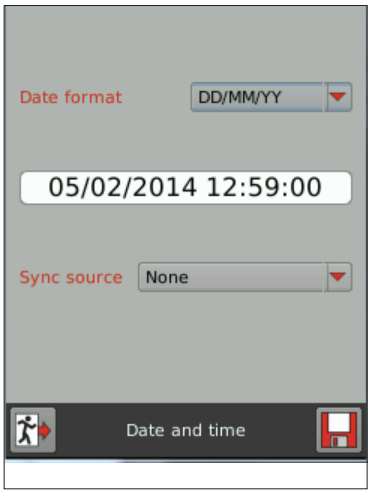
• Enter a description (up to 40 characters).

Torque unit	Nm, ft lb, in lb, kg m, kg cm, oz in.
Speed unit	rpm % of max tool speed
Keypad beep enabled	If selected, this function enables a "Beep" sound each time a button is pressed.
Back light auto off	The screen will be automatically turned off after the timeout. The screen will turn on as soon as: - the screen is touched - when a tightening result is displayed.
Back light timeout	The timeout value for the automatic back light switching off can be set between 1 and 60 min.

• Tap the "Save" icon to save and quit the screen.

4.3 - Date & time

Path: Main menu / Configuration / Controller / User interface



This function is used to synchronize the controller date and time to ensure that the tightening results are stored with the correct date and time.

• Select the date format.
- DD/MM/YY
- YY/MM/DD
- MM/DD/YY

• Tap the current date and time to display the time keyboard.

- Select year / month / day and time.
- Select the "Sync source" which will set the date and time in the controller.

- None
- CVI CONFIG
- CVINet
- Fieldbus
- Ethernet protocol
- Server NTP. Enter the server address.
- Toolsnet

For example: If "Sync source" is set at "CVI CONFIG", the controller date and time will be updated during the data transfer from the software to the controller.

- Tap the "Save" icon to save and quit the screen.

4.4 - Access manager

Path: Main menu / Configuration / Controller

It is recommended to protect the controller parameters against hazardous changes.

When the controller is delivered, the access manager is not activated and any modification can be done.

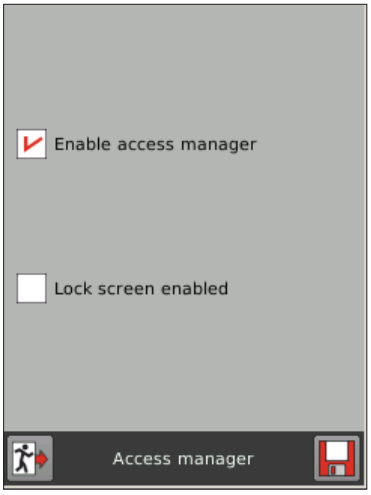
The padlock on the bottom left of the screen is open.

The "Access manager" menu is disabled (in grey).

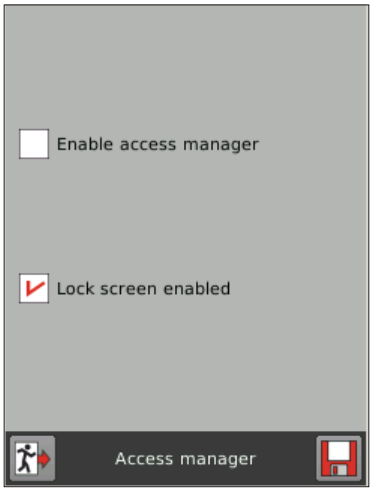
To activate the access manager on the controller, you need to have a USB stick with the right profile (configured with the Desoutter CVIKEY software).

- If not, contact your CVIKEY manager for support.

- Connect your USB stick to the front panel of the controller.
- Tick "Enable Access Manager" if you want the user to display the screens without modifying them.



- Tick "Lock screen enabled" to lock the screen in Monitoring views.

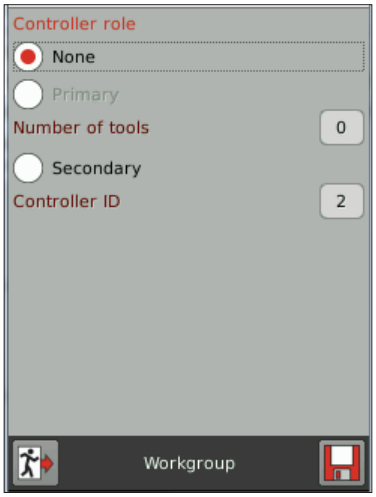


This icon will be then displayed on the top right of the Monitoring screen.

- Tap the "Save" icon to save and quit the screen.

4.5 - Workgroup

Path: Main menu / Configuration / Controller



A workgroup is a system designed to drive from 2 to 12 fixtured tools with cable connection.

It is composed of a single primary controller and several secondary controllers. The primary controller drives the tools. It is also the unique access point for every communication interface used on the system.

4.5.1 - None (stand-alone)

- Click "None" to state that the controller is stand-alone.

4.5.2 - Primary controller

- Plug an ePOD3 into the bottom panel.
- Click "Primary" to state that the controller is selected as the primary controller of the workgroup.
- Select the number of tools of the workgroup (up to 12).
- Tap the "Save" icon to save.

Ethernet ports 3 and 4 on the controller are not available anymore as they are from now dedicated to the workgroup network.

To continue working with CVI CONFIG, check that the PC Ethernet cable is connected to port 1 or 2.

4.5.3 - Secondary controller

The controller is selected as one of the secondary controllers of the workgroup.

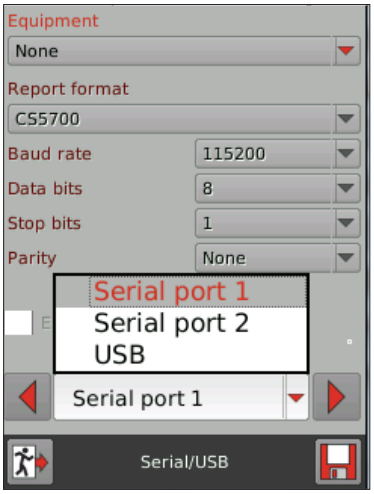
- Select the controller ID (position of the tool) in the workgroup.

When changing from "Secondary" to "None", the network configuration previously set for the stand-alone controller will be restored.

Refer to "Appendix - CVI3 connections" to get more information.

4.6 - Serial / USB

Path: Main menu / Configuration / Controller / Peripherals



4.6.1 - Serial ports

The serial ports are used to communicate with external peripherals (barcode reader, DELTA measuring unit, etc...).

- As there is only one physical serial connector on the controller bottom panel, use the Y cable especially designed by Desoutter for serial ports - part no. 6159176200 if you want to use serial ports 1 and 2.

- Select an equipment for each serial port and fill in the data required for the exchange:

Baudrate	from 300 to 115200
Data bits	7 / 8
Stop bit	1 / 2
Parity	none / odd / even

- In case of a computer or serial printer, select "Report output" and then "PC4" or "CS5700".
- When the equipment is "Barcode reader", be sure that the barcode reader settings are "scanned data" + CR and LF terminators.
- Tick "Enable power supply" to provide 5V (pin 9) to a barcode reader for example.

To avoid damaging the equipment, make sure the settings are the same in the appliance, the controller and CVI CONFIG.

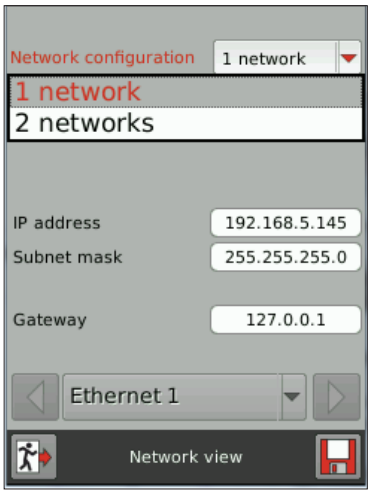
- Tap the "Save" icon to save and quit the screen.

4.6.2 - USB

- Select the equipment to connect to the USB ports. The setting is done automatically.
- When the equipment is "Barcode reader", be sure that the barcode reader settings are "USB keyboard emulation USA".
- Tap the "Save" icon to save and quit the screen.

4.7 - Networks

Path: Main menu / Configuration / Controller / Peripherals



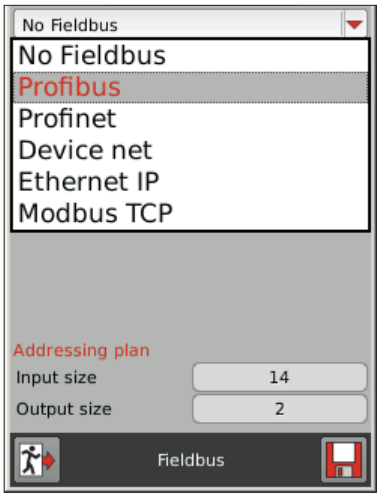
1 network	1 2 3 4	• Plug the Ethernet cable into any port.
2 networks	1 2	Ethernet network 1
	3 4	Ethernet network 2

- Enter the network name (up to 40 characters).
- Enter the controller IP address, Subnet mask and Gateway parameters.
- Tap the "Save" icon to save and quit the screen.

4.8 - Fieldbus

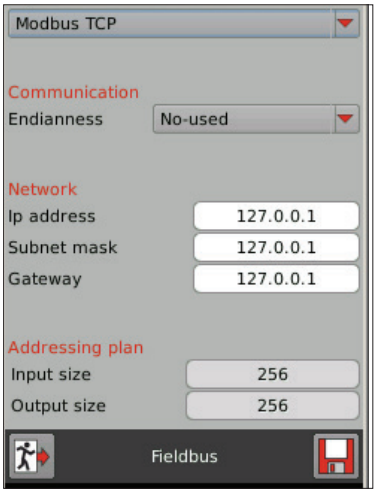
Path: Main menu / Configuration / Controller / Peripherals

- Select the type of Fieldbus according to the Fieldbus module installed in the controller.



- Fill in the screens.

For example:



- Tap the "Save" icon to save and quit the screen.

- For more information about how to setup Fieldbus, refer to the CVI CONFIG user manual at **http://resource-center.desouttertools.com.**

4.9 - Customized protocol

Path: Main menu / Configuration / Controller / Peripherals

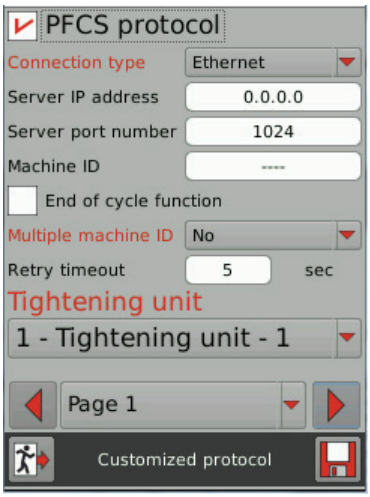
- Plug the "PFCS" ePOD into the bottom panel of the controller.

- For more information about installing the ePOD, refer to the installation manual" part no. 6159931050 at **http://resource-center.desouttertools.com.**

- Click "Customized protocol".
- Tick "Customized protocol activated" to activate the connection to the controller and check the ePOD is present.

A new screen is then displayed.

- Tick the box on the top left to activate the protocol.
- Fill in the parameters.



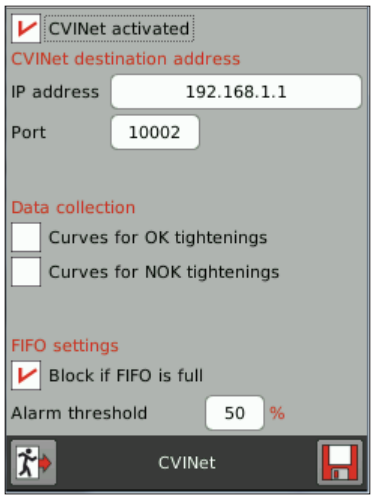
- Use the left, right or down arrow keys to display the next page.

- For further information, contact your Desoutter representative for support.

- Tap the "Save" icon to save and quit the screen.

4.10 - CVINet

Path: Main menu / Configuration / Controller / Peripherals



- Tick "CVINet activated".
- Enter the IP address of the server where CVINet software is installed.
- Fill in the data required for the exchange.

Data collection	• Select the data you want to collect: - Curves for OK tightenings - Curves for NOK tightenings.
FIFO settings	The controller regularly sends results to CVINet. The purpose is to provide a full traceability even when the network connection is unstable.
Block if FIFO is full	1. The controller is able to keep a defined number of results previously generated by each tightening unit (typically 10,000). The alarm threshold corresponds to the percentage of these results that have not been sent to the server and stored in CVI3 FIFO memory.

	2. When option "Block if FIFO is full" is enabled, a tightening unit is locked when the FIFO level is 100%. It allows to ensure traceability of all generated results. The tightening unit is unlocked when connection is re-established and FIFO level is under 100%. When disabled, no lock is set when FIFO level is 100%, and traceability of all results is not ensured.
Alarm threshold	The value of "Alarm threshold" sets the level of the FIFO that triggers an alarm message on the controller display and set the "Reporting alarm" output event. The controller is not locked by this alarm. The alarm informs on possible communication issues with the server. Maintenance operators can solve the issue before the controller is locked (if option "Block is FIFO is full" is enabled), or before traceability of some results is lost (if option "Block is FIFO is full" is disabled).

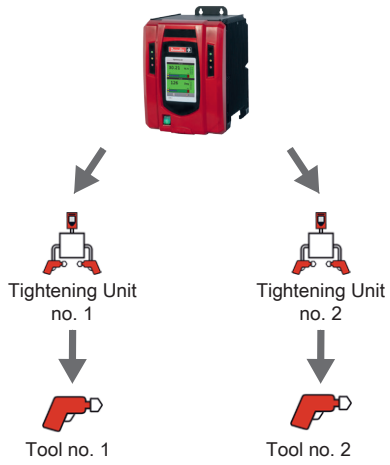
- Tap the "Save" icon to save and quit the screen.

5 - TIGHTENING UNIT MANAGEMENT

The TWINCVI3 controller manages 2 tools driven by 1 or 2 tightening units depending on whether the operating mode is synchronous or asynchronous. The operating mode shall be selected according to the application.

5.1 - Asynchronous operating mode

- There are 2 tightening units.
- Both tools can start independently.
- Tightening reports are independent.

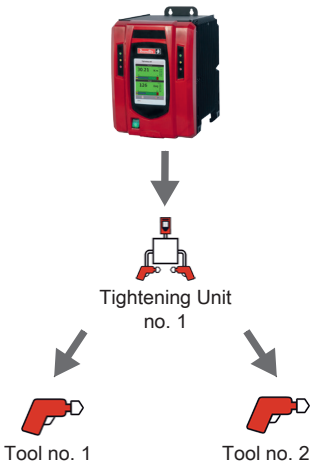


Tool no. 1 report	Tightening Unit no. 1 report
OK	OK
NOK	NOK

Tool no. 2 report	Tightening Unit no. 2 report
OK	OK
NOK	NOK

5.2 - Synchronous operating mode

- There is 1 tightening unit.
- Both tools start together (common "Start" signal).
- The tightening steps of each tool can be synchronized.
- The tightening report depends on both tools reporting.



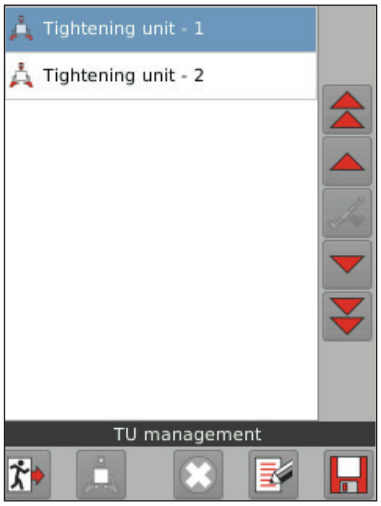
Tool no. 1 report	Tool no. 2 report	Tightening Unit no. 1 report
OK	OK	OK
NOK	OK	NOK
OK	NOK	NOK
NOK	NOK	NOK

5.3 - How to change the operating mode

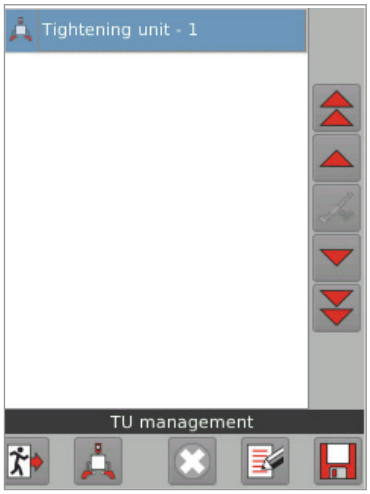
By default, the controller is in asynchronous mode.

It is strongly recommended to select now in which mode the controller will run.

Path: Main menu / Configuration / TU management



	• To change to synchronous mode, select the second Tightening Unit and press this icon.



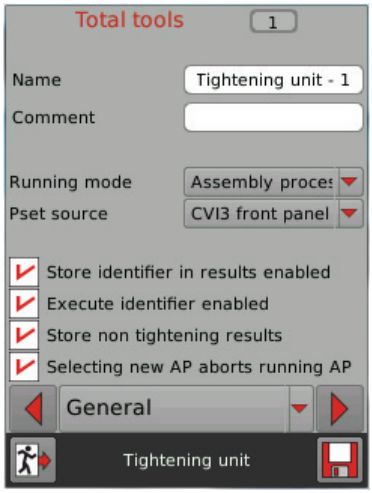
	• To return to the asynchronous mode, click the this icon to add the second Tightening Unit.
	• When the mode selection is done, select a Tightening Unit and tap this icon to start the Tightening Unit setup.

- Tap the "Save" icon to save and quit the screen.

5.4 - General

5.4.1 - Asynchronous mode

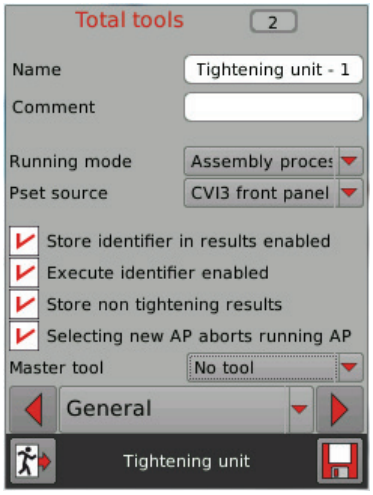
- Select first the Tightening Unit to display.
- Tap this icon to start the setup.



5.4.2 - Synchronous mode

- Tap this icon to start the setup.

The Tightening Unit set up is made for both tools.



5.4.3 - Master tool (in synchronous mode and for portable electric nutrunners only)

This feature allows to select which tool trigger will start both tools.

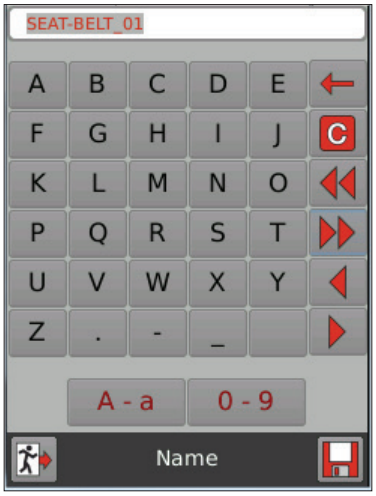
When tool no.1 is the master tool, tool no. 2 is disabled and vice-versa.

When "No tool" is selected, both tools will start from the external input event (Start/stop tightening). The trigger of the tools must be pressed and locked.

- Use the Desoutter "Trigger locker" part no. 6153978420 to have the tool trigger pressed continuously.

5.4.4 - Add a name and comment

- Enter a name (up to 40 characters) and a comment (up to 100 characters).
- Use the text keyboard to write and customize the texts.



- Select the "Running mode" according to your assembly configuration:

Pset	The tightening unit will run accordingly to the selected Pset.
Assembly Process	The tightening unit will run according to the selected Assembly Process.

5.4.5 - Pset selection source

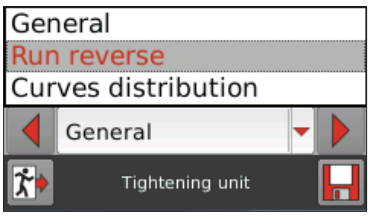
- Select the Pset selection source:
- I/O
- CVI3 front panel
- CVILOGIX
- Open protocol
- Fieldbus
- Socket tray

5.4.6 - Options

- Tick "Store identifier in results enabled" to record one or more identifiers in the tightening results. Refer to CVI CONFIG software to set up the identifiers.
- Tick "Execute identifier enabled" to trigger an action linked to the reception of an identifier. Refer to CVI CONFIG software to change the identifier.
- Tick "Store non tightening results" to record results other than tightening results in the controller memory, e.g. run reverse results, batch increment results.

The function "Selecting new AP aborts running AP" is available in the Assembly Process running mode only. Refer to CVI CONFIG software to see the settings in details.

- Use the left, right or down arrow keys to display the next screens.



5.5 - Run reverse parameters

- Select the "Reverse mode" to reverse the tool direction before starting.

Reverse once	Pushing the reverse button, the reverse direction is selected; the tool starts in reverse direction when the operator presses the start trigger. Once the tool has run, the tightening direction is automatically re-activated.
Alternate	Pushing the reverse button, the reverse direction is selected. The tool starts in reverse direction when the operator presses the start trigger. Pushing again the reverse button, the tightening direction is selected.
Reverse disabled	The reverse direction is not possible.

- Fill in the following values:

Speed	% or rpm of max. tool speed	This can be used for any run reverse operation (except for a Pset loosening step).
Min. torque and Min. Angle	Nm Deg	These will allow to detect a real loosening of the assembly. The "Fastener loosened" output event is activated.
Maximum time	s	Maximum loosening duration. The tool stops automatically after this time.
Max. number of turns	0-999	Maximum loosening turns from trigger start. The tool will stop automatically when this number is reached.

5.6 - Options on "Reject report"

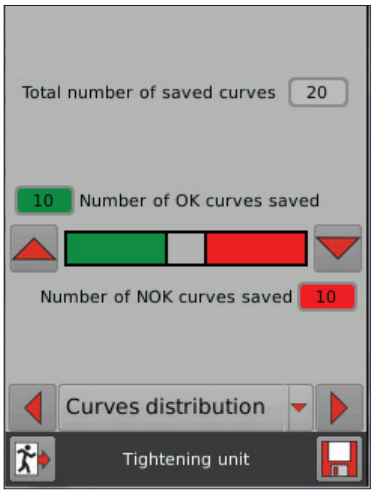
This option will prevent the operator from performing another tightening operation after a NOK report.

- Select one of these options to unlock the tool and allow the operator to do tightenings again.

Input unlock	by actuating the "Error Acknowledge" input event.
Reverse direction unlock	by pushing the run reverse button or selecting the reverse direction.
Run reverse unlock	by performing a run reverse with programmed run reverse min. torque and angle reached.

- Tap the "Save" icon to save and quit the screen.

5.7 - Curves distribution

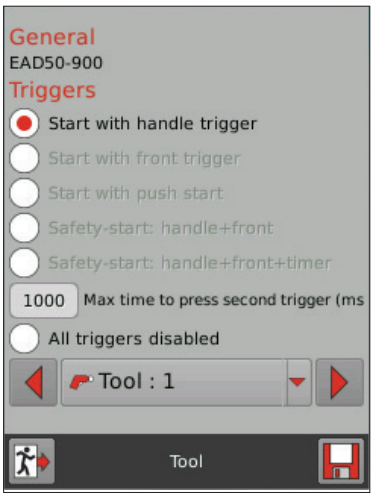


- Select your own curve distribution by sliding the cursor. The maximum number of curves displayed depends on the model of ePOD connected.
- Tap the "Save" icon to save and quit the screen.
- Tap the screen to start and go to "Main menu / Configuration / TU management".

6 - TOOL CONFIGURATION

Path: Main menu / Configuration / Tool

This part shows the configuration of each connected tool. It may be different according to the tool model.



- Select how to manage the triggers.

Safety-start: handle+front	This mode means that the operator has to press two triggers at the same time to perform the tightening operation. The purpose is to ensure that the operator has both hands on the tool before triggering.
Safety-start: handle+front+timer	This mode forces the operator to press the 1st trigger and then the 2nd trigger in a defined time. • Enter the max. time in ms. When this time is reached and the second trigger is not pressed, the tool will not start.

- Tick "All triggers disabled": triggers are no longer active. The only possibility to start the tool is to use the external input event (Start/stop tightening) and in that case, the tool trigger must be pressed and locked.

  - Use the Desoutter "Trigger locker" part no. 6153978420 to have the tool trigger pressed continuously.

- Tap the "Save" icon to save and quit the screen.

7 - PSET PROGRAMMING

Path: Main menu / Configuration / Pset

A Parameter set is commonly called Pset and shown by this icon.

A Pset is combining one or several steps, each step describing a function. The tool will execute the steps one after the other in the given order. Content of the steps and the order can be changed at any time.

The minimum to run the tool is 1 Pset containing 1 step.

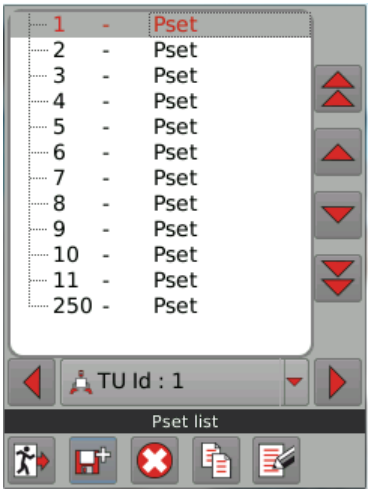
There are up to 250 Psets per tightening unit.

	to go to the first Pset
	to go to the previous Pset
	to go to the next Pset
	to go to the last Pset

- Once the programming is done, tap this icon to save the changes in the controller and quit the screen.

7.1 - Asynchronous mode - list of Psets

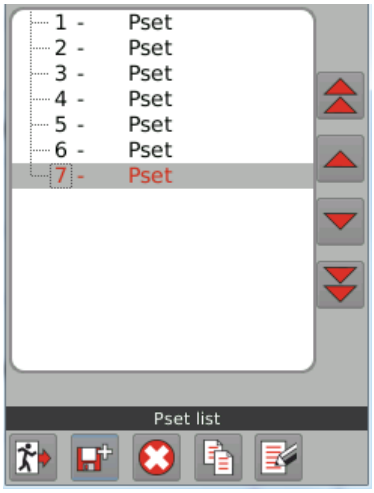
Each Tightening Unit has its own list of Psets.



- Use the left, right or down arrow keys to display the screens for the Tightening Unit 2.

7.2 - Synchronous mode - list of Psets

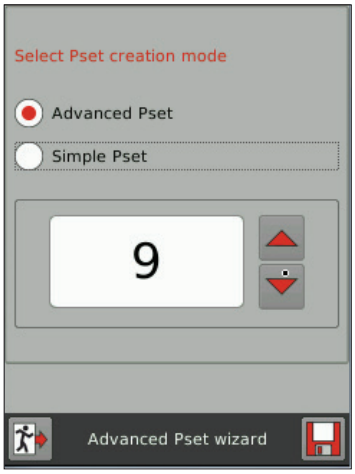
The list of Psets is common to both tools.



7.3 - How to add a Pset

- Select first the Tightening Unit. The list of Psets can be different per Tightening Unit.

- Tap this icon to add a Pset.



7.3.1 - Advanced Pset

- Tap "Advanced Pset" to create a new Pset and add it in the list of Psets.
- Tap "Save" to validate.

7.3.2 - Simple Pset

- Tap "Simple Pset" to create a new Pset and quickly set it up.
- Use the left, right or down arrow keys to display the next screens.
- Enter the Target torque.
- Customize the Pset name.

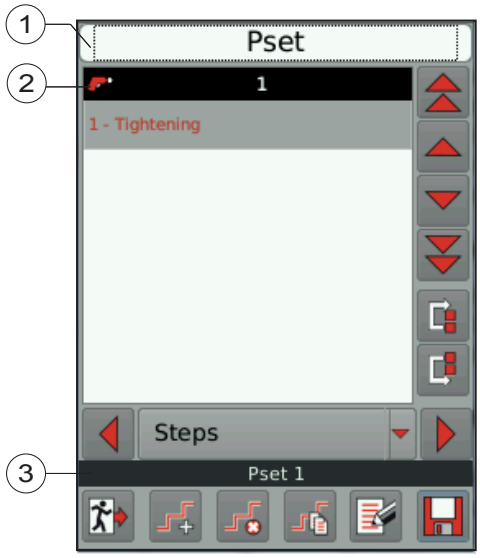
The tightening strategy is "Torque control".

Tolerances, curves and speeds are automatically calculated.

- Tap "Save" to validate.

7.4 - General

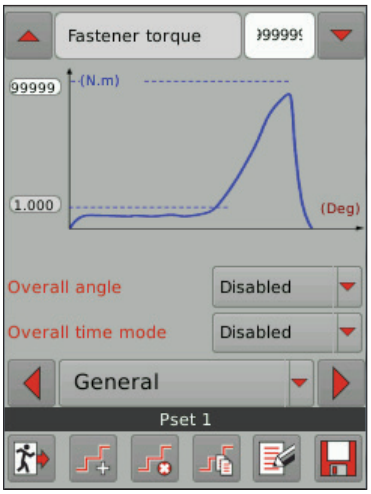
In the list of Psets, tap this icon to edit a Pset.



Legend

1 Pset name
2 Tool no. 1
3 Pset number

- Use the left, right or down arrow keys to display the next screens.



- Tap anywhere on the screen.

7.4.1 - Remove fastener torque limit

The "Remove fastener torque limit" is the torque limit above which the fastener (bolt and screw) may have suffered damage and must be replaced. By default, the value is set to 120% of the target torque. This torque value may lie above the maximum tool torque.

7.4.2 - Pset start torque

The "Pset start torque" is the torque value that must be reached to declare the Pset as started. Below this value, neither result or report will be generated.

7.4.3 - Overall angle mode

The "Overall angle" can be measured during the complete tightening operation, i.e. starting at the overall angle threshold until the end. This option excludes the use of "Overall time mode".

- Disabled: the overall angle is not measured.
- Monitoring: the overall angle is checked at the end of the Pset execution.
- Control: if the overall angle gets out of limits, the result of the tightening operation is NOK and the tool stops.

7.4.4 - Overall time mode

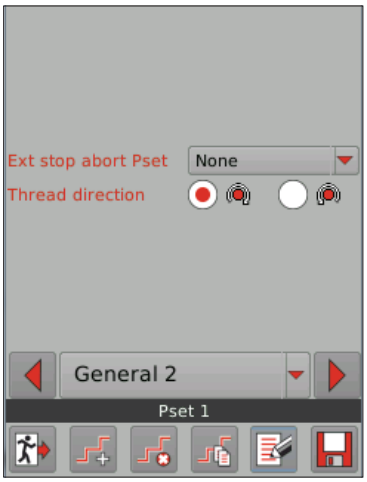
The "Overall time" can be measured during the complete tightening operation, i.e. starting at the overall time threshold until the end. This option excludes the use of "Overall angle mode".

- Disabled: the overall time is not measured.
- Monitoring: the overall time is checked at the end of the Pset execution.

If the "Overall time" gets out of limits, the report is NOK.

- Tap the "Save" icon to save and quit the screen.

7.5 - General 2



7.5.1 - External stop abort Pset

When the input event "External stop abort Pset" is activated, the Pset automatically stops.

The execution conditions can be as follows:

	on rising edge
	on falling edge
/	on change (rising or falling)
	on high level
	on low level

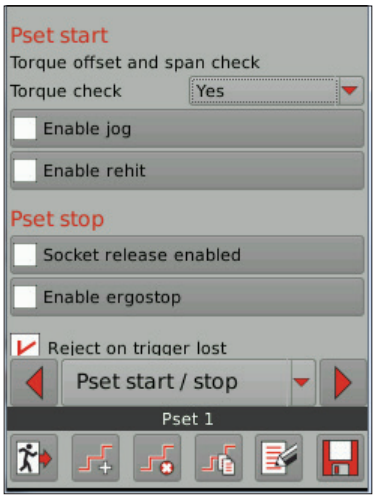
7.5.2 - Thread direction

The "Thread direction" is used to define in which direction the tool will run during a tightening operation.

	clockwise
	counterclockwise

- Go to the "Pset start / stop" screen by tapping the left or right arrow.

7.5.3 - Pset start/stop



7.5.4 - Torque transducer offset and span check

If yes, the torque transducer offset value will be checked at each Pset start and a span test will be performed. It is recommended to set this parameter to "Yes" to clear the torque transducer offset and to check the span drift.

7.5.5 - Reject on trigger lost

The tightening report will be declared as NOK if the start signal is released before the target is reached.

- Tick this option: yes / no.

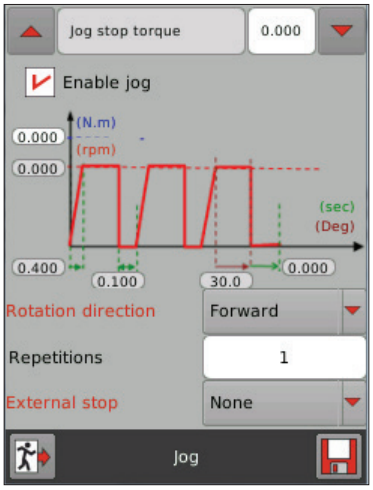
If yes, the Pset is rejected if the start signal is released before the end of the tightening operation.

If no, the report is only based on trend (the start signal is not taken into account in the report calculation).

7.5.6 - Jog

This function helps to fit the tool socket onto a bolt.

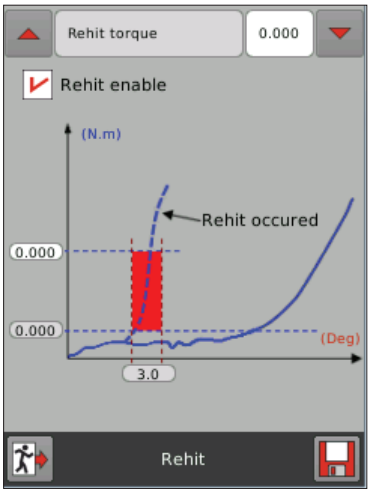
When enabled, the tool turns a given "rotation angle" in a specific direction (forward, reverse or alternate) and repeatedly (n times).



- Tick the box on the top left to activate the function.
- Tap the "Save" icon to save and quit the screen.

7.5.7 - Rehit

This function is used to detect that a joint has been re-tightened.



The conditions for rehit are:

- the "Rehit" function is enabled

AND

- the Rehit torque is reached before having reached the Rehit angle.

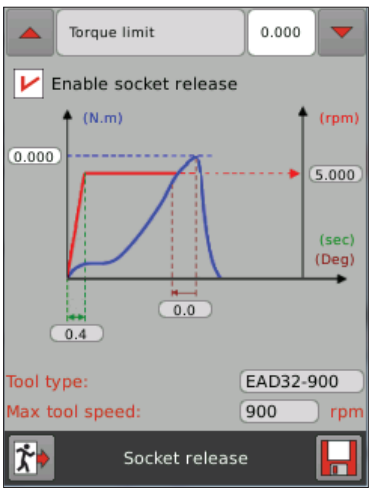
i.e.: Angle* ≤ Rehit angle

* angle = angle $_{\text{rehit torque}}$ - angle $_{\text{rehit threshold}}$

- Tick the box on the top left to activate the function.
- Tap the "Save" icon to save and quit the screen.

7.5.8 - Socket release

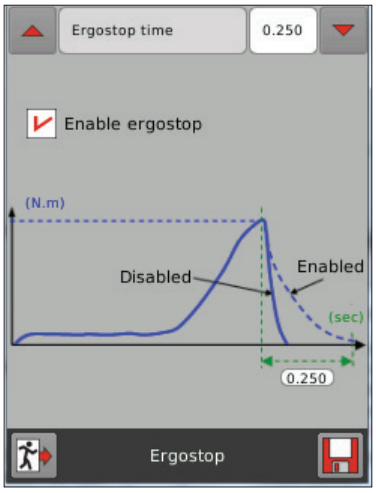
This function is used to release the constraint between the socket and the screw. When relaxation is enabled, the tool rotates in reverse a few degrees in order to easily remove the socket.



- Tick the box on the top left to activate the function.
- Tap the "Save" icon to save and quit the screen.

7.5.9 - Ergostop

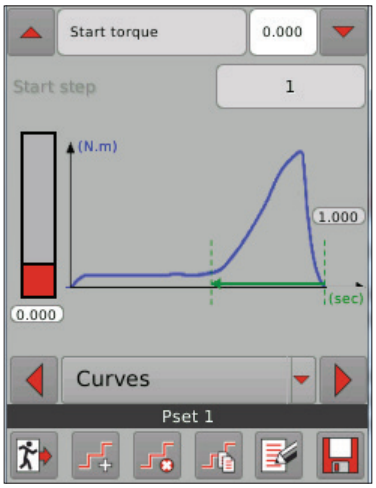
This option allows for a smoother tool stop in order to reduce torque reaction on the operator.



- Enter the time of the braking phase: from 0.01 to 1 second.
- Tick the box on the top left to activate the function.

7.6 - Curves

- Select the type of curves recording performed by the controller.

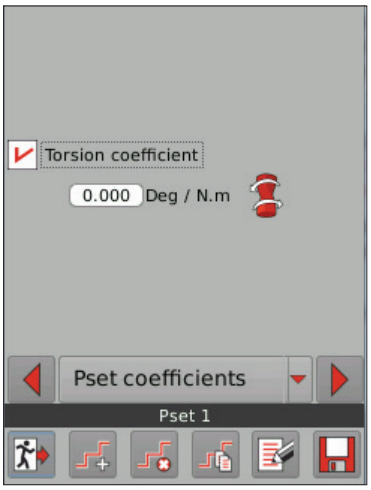


- Tap anywhere on the screen to select:

Start torque	The torque and angle values are saved from the start torque till the end of the tightening during a set time. If the start torque is > 0, a forward recording is executed from a defined step number during a maximum time. If the start torque = 0, a backward recording is executed in a sliding window in a defined period.
Time	A curve has a maximum of 2,000 points. *The longer the recording time is, the less accurate the curve is.*

- Tap the "Save" icon to save and quit the screen.

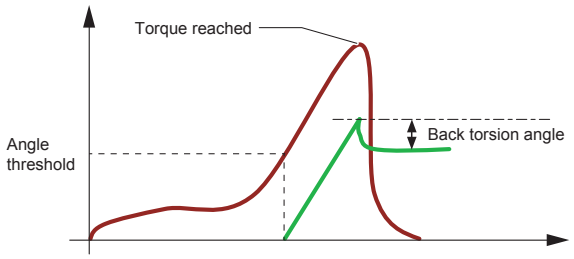
7.7 - Pset coefficients



The torsion coefficient allows to compensate a possible mechanical torsion of an extension of tool or crowfoot (to be used only when tightening with target angle).

0.000 ≤ Torsion coefficient ≤ 1.000

This coefficient can be measured on the curve registered on the machine from the back torsion angle and the torque reached.



$$\text{Coefficient} = \frac{\text{Target angle - Final angle}}{\text{Final torque - angle threshold}}$$

Example:

Target Angle	100°
Final Angle	97°
Angle threshold	20 Nm
Final Torque	120 Nm

$$\text{Coefficient} = \frac{(100 - 97)°}{(120 - 20)\ \text{Nm}} = 0.03°/\text{Nm}$$

- Tick the box on the top left to activate the function.
- Tap the "Save" icon to save and quit the screen.

7.8 - How to copy / paste / delete a Pset

	Copy	• Select first a Pset in the list of Psets.
	Paste	
	Delete	

8 - STEP PROGRAMMING

A Parameter set is composed of one or several steps run consecutively, up to 15 steps per Pset.

Each step is defined by main parameters, tightening instructions and motor settings.

Generally, for the tightening steps:

- Strategies covers control of target values, safety values, tolerance values, monitoring and options.
- Motor control deals with the way the target is reached, acceleration, rundown speed, speed strategy, etc...
- General parameters cover the general parameters for each step. The default values are generally convenient.

A step is shown by this icon.

The "Tightening step" is displayed by defaut.

8.1 - Asynchronous mode - list of steps

Each Pset has its own list of steps.

Below the list of steps of Pset 1 for Tightening unit 1.

8.2 - Synchronous mode - list of steps

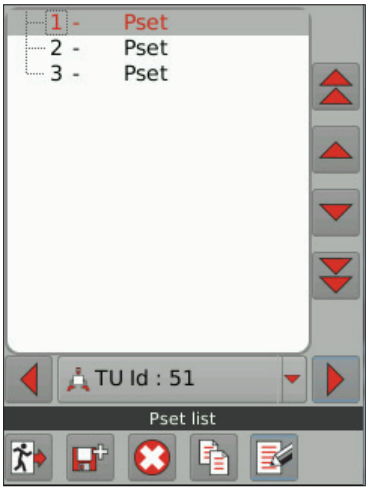
The list of steps is identical for each Tightening Unit (tool) but values can be different.

8.3 - How to add/organize the steps

Path: Main menu / Configuration / Pset

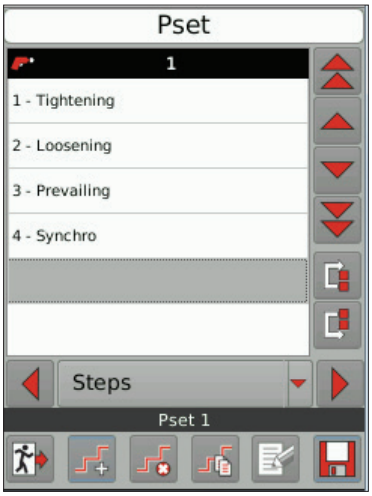
- Connect the tool to correctly adjust the parameters.

- Go to the list of Psets and select a Pset.



- Tap this icon to add a new step.

Example of steps:



	to move up and down a step.
	to delete a step
	to copy a step
	to edit a step.

	• Use the following icons to navigate from one screen to another: Control Monitor Options Motor control General
	to save the changes in the controller.

- Tap "1. Tightening".

The goal is to select the steps, organize their order and the possible synchronization.

The first tightening step cannot be deleted.

- Tap "Rotation" to select the following steps:
- Tightening
- Loosening
- Prevailing

- Tap "Synchro" to sync the rotation steps.

- Tick "Before" or "After" to insert the new step before or after the step highlighted.

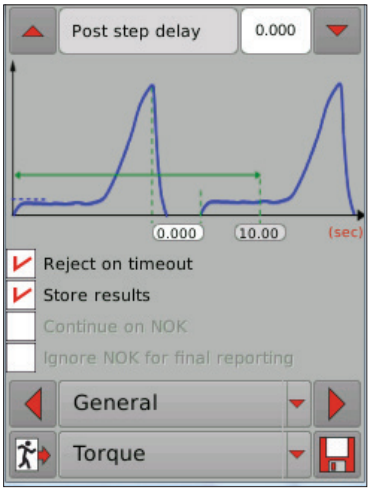
- Tap the "Save" icon to save and quit the screen.

Now the target is to define each step in details and set up parameters according to the tightening application.

8.4 - General

The general parameters are common to all tools.

- Tap "General":



Post step delay

This is the time required before executing the next step.

Max. time

This is the maximum step duration (10 s by default).

Reject on timeout

- Tick "Reject on timeout" to declare the step NOK when the time is exceeded.

Store results

- Tick the box to record the step in the tightening results.

By default, only the last step executed is stored in the results.

Continue on NOK and Ignore NOK for final reporting

Step no.	Step report	Continue on NOK	Ignore NOK for final reporting
		The Pset tightening will continue even if the step report is NOK.	The NOK step will not be taken into account to generate the Pset report.
Example no. 1			
1	NOK	on	- off
2	NOK	- off	- off
3	-	- off	- off
Tool Pset report		NOK	
Example no. 2			
1	OK	- off	- off
2	NOK	on	- off
3	OK	- off	- off
Tool Pset report		NOK	
Example no. 3			
1	NOK	on	on
2	OK	- off	- off
3	OK	- off	- off
Tool Pset report		OK	

- Tap the "Save" icon to save and quit the screen.

8.5 - Tightening

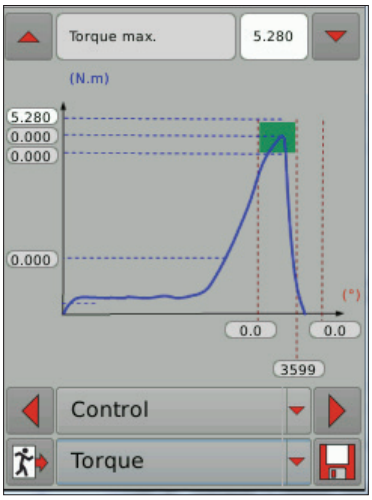
- In the list of steps created for tool no.1, tap "Tightening".

- Tap this icon to edit the step.

- Use the left, right or down arrow keys to navigate from one screen to another.
- Select the type of control:
- Tap anywhere on the curve to display the screen of values.
- Fill in the values.
- Tap the "Save" icon to save and quit the screen.

8.5.1 - Torque control

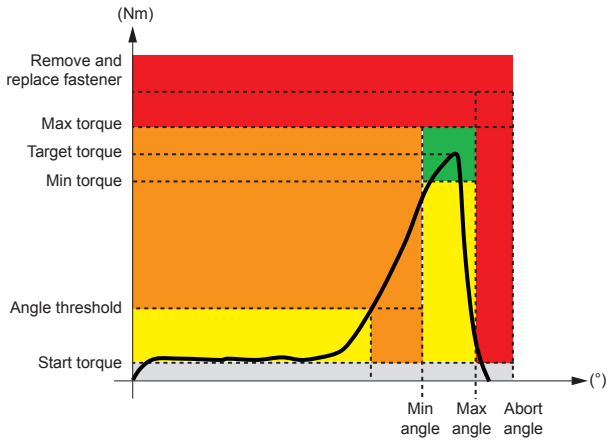
A torque control strategy coupled with an angle monitoring is adapted for most assemblies.



Stop conditions
IF Torque ≥ Target torque OR Angle > Abort angle

Report OK	IF Min torque < Peak or Final Torque < Max torque AND IF Min angle < Peak or Final Angle < Max angle

For each channel, the 3 report controller LEDs will light according to the following diagram.

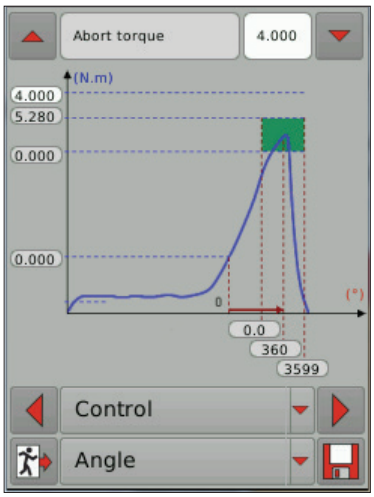


Result data	Peak OR Final torque Peak OR Final angle

8.5.2 - Angle control

A tightening angle control strategy is adapted for assemblies requiring tension accuracy.

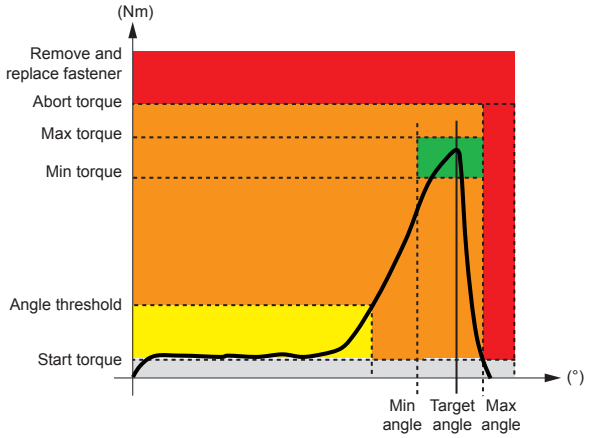
This strategy provides a better control of the tension and a better repeatability and accuracy than the torque control strategy.



Stop conditions
IF Angle ≥ Target angle OR IF Torque ≥ Abort torque

Report OK	IF Min torque < Peak or Final Torque < Max torque AND IF Min angle < Peak or Final Angle < Max angle

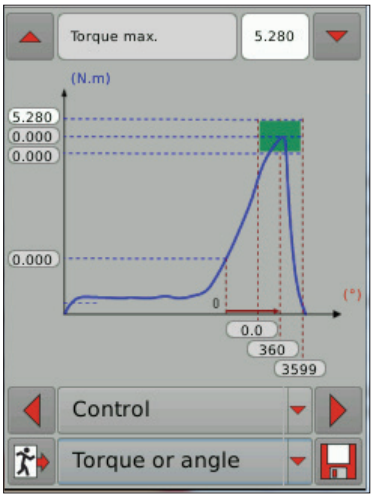
For each channel, the 3 report controller LEDs will light according to the following diagram.



Result data	Peak OR Final torque Peak OR Final angle

8.5.3 - Torque OR angle control

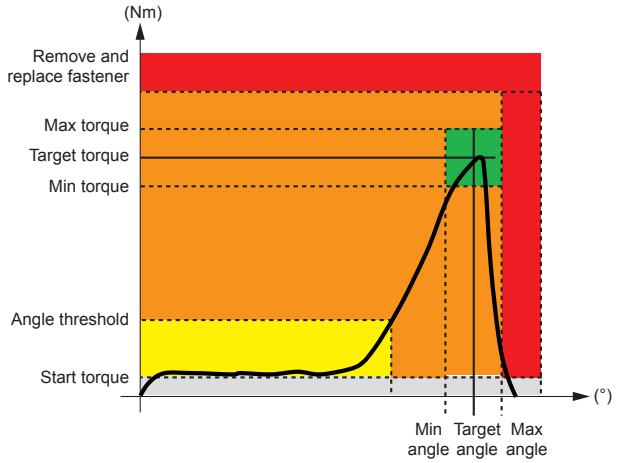
The tightening torque OR angle control strategy is adapted for assemblies requiring tension accuracy.



Stop conditions
IF Torque ≥ Target torque OR IF Angle ≥ Target angle

Report OK	IF Min torque < Peak or Final Torque < Max torque AND IF Min angle < Peak or Final Angle < Max angle

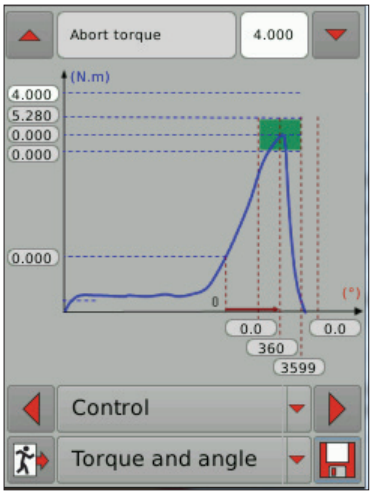
For each channel, the 3 report controller LEDs will light according to the following diagram.



Result data	Peak OR Final torque Peak OR Final angle

8.5.4 - Torque AND angle control

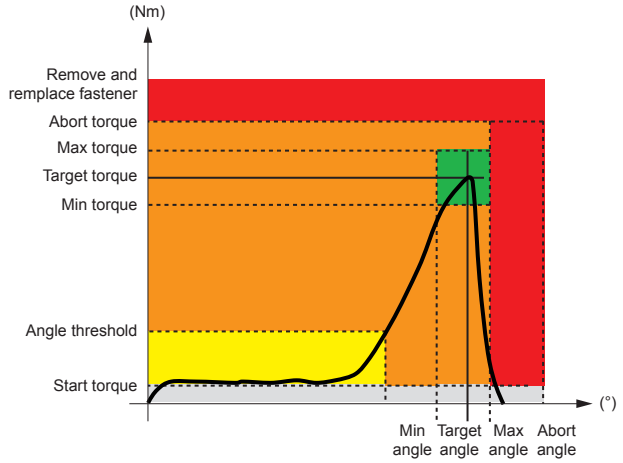
The tightening torque AND angle control strategy is adapted for assemblies requiring tension accuracy.



Stop conditions
IF Torque ≥ Target torque AND Angle ≥ Target angle OR IF Torque ≥ Abort torque OR IF Angle ≥ Abort angle

Report OK	IF Min torque < Peak or Final Torque < Max torque AND IF Min angle < Peak or Final Angle < Max angle

For each channel, the 3 report controller LEDs will light according to the following diagram.



Result data	Peak OR Final torque Peak OR Final angle

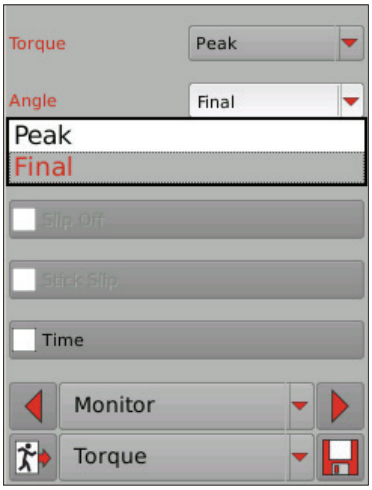
8.5.5 - Yield point control

- Launch CVI CONFIG software to setup this strategy.
- For more information, refer to the CVI CONFIG user manual at **http://resource-center.desouttertools.com.**

8.6 - Monitoring & options

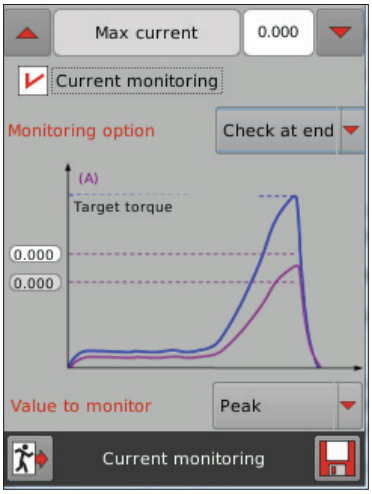
For all control strategies, torque and angle are systematically monitored.

For torque and angle monitoring, it is possible to choose either the peak value or the final value to be monitored. Generally, the peak value is used for the torque and the final value for the angle.



- Select torque and angle monitorings: peak/final
- Tick one or more monitorings.
- Tap the "Save" icon to save and quit the screen.

8.6.1 - Current monitoring



The "Current / check at end" monitoring checks the current value when the target torque is achieved depending on Peak or Final torque monitored.

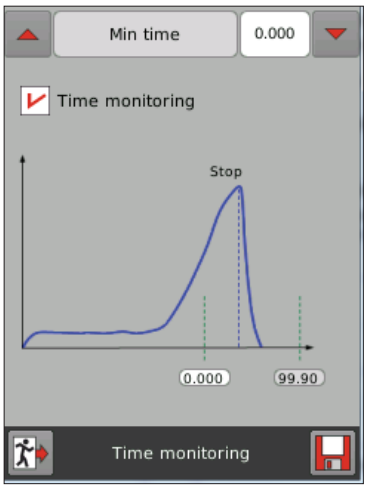
The monitored value can be "Peak" or "Final".

Report OK	IF Min current < Current < Max current.

- Fill in the values.
- Tap the "Save" icon to save and quit the screen.

8.6.2 - Time monitoring

The time monitoring is made to frame the tightening operation duration.



A step duration can last from 0 to 600 sec.

- Fill in the values.
- Tap the "Save" icon to save and quit the screen.

8.6.3 - Angle reset

- Tick this option to reset the angle measurement at the beginning of the step.

8.6.4 - Torque reset

- Tick "Torque Reset" to reset the torque measurement at the beginning of the step.

8.6.5 - Offset reset

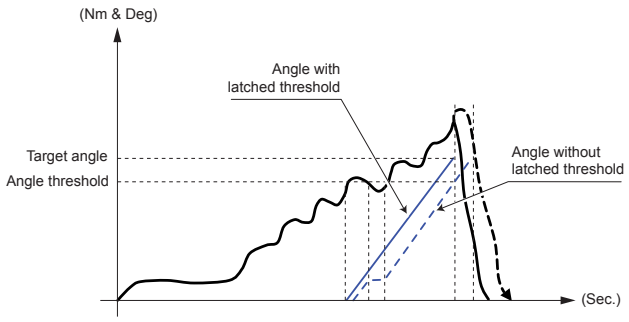
- Tick this option to reset the "Prevailing torque offset" at the beginning of this step.

8.6.6 - Latch threshold

The controller starts measuring the angle when the torque crosses the angle threshold for the first time.

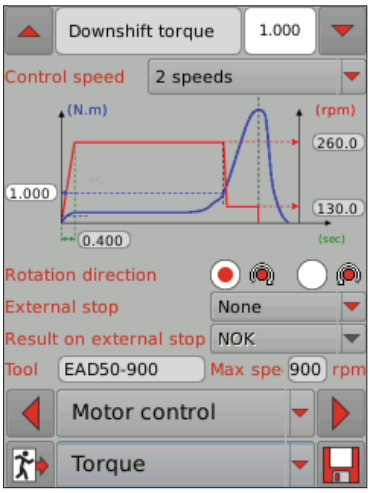
When this option is ticked, the measure then continues till the end even if the torque becomes below the threshold. The measured angle is therefore closed to the real angle.

When this option is not ticked, the controller stops counting the angle when the torque falls below Angle threshold.



8.7 - Motor control

8.7.1 - 2 speed



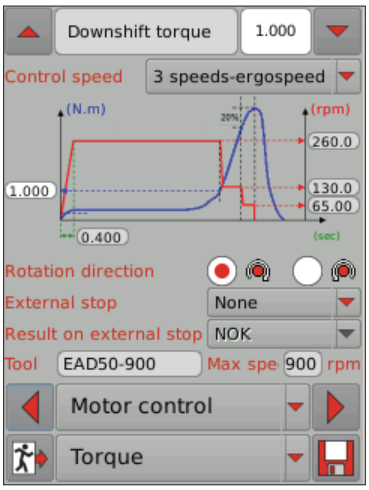
Starting at the start signal, the tool runs with a programmed acceleration up to Rundown speed. The tool keeps running at Rundown speed. Once Downshift torque has been reached, the speed changes to Downshift speed.

Parameters

Acceleration time	Time to increase speed from 0 to Rundown speed.
Rundown speed	Speed applied from start to downshift torque to optimize productivity
Downshift torque	Torque where speed moves from Rundown to Downshift speed.
Downshift speed	Speed applied from Downshift torque to motor stop to optimize quality.
Rotation direction	Clockwise / Counterclockwise

- Tap the "Save" icon to save and quit the screen.

8.7.2 - 3 speed - ergospeed



Starting at the start signal, the tool runs with a programmed acceleration up to Rundown speed. The tool keeps running at Rundown speed. Once Downshift torque has been reached, the speed changes to Downshift speed. Once 80% of the Target torque has been reached, the speed changes to Final speed.

Parameters

Acceleration time	Time to increase speed from 0 to Rundown speed.
Rundown speed	Speed applied from start to downshift torque to optimize productivity
Downshift torque	Torque where speed moves from Rundown to Downshift speed.
Downshift speed	Speed applied from Downshift torque to the 2nd Downshift to break inertia or very hard joints.
Final speed	Speed applied from the 2nd Downshift (80% of Target torque) to motor stop (to optimize quality on very hard joint).
Rotation direction	Clockwise / Counterclockwise

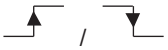
- Tap the "Save" icon to save and quit the screen.

8.8 - "External stop to next step" option

- Select the "External stop to next step" input to stop the current step and skip to the next one.

The conditions can be as follows:

The input event is: "External stop to next step".

	on rising edge
	on falling edge
	on change (rising or falling)
	on high level
	on low level

- If the "External stop to next step" event condition is detected, the step report can be forced to OK/NOK or will depend on the Monitoring.

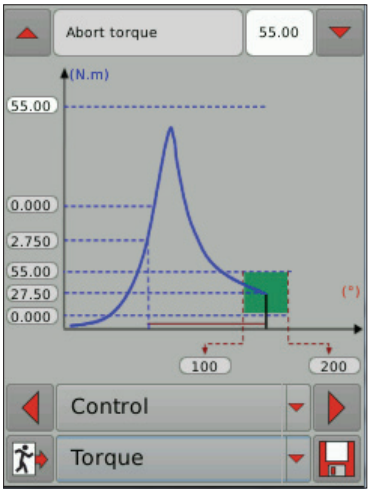
8.9 - Loosening

The loosening function allows un-tightening the joint according to torque or angle control.

- Select the type of control:
- Tap anywhere on the curve to display the screen of values.
- Fill in the values.
- Tap the "Save" icon to save and quit the screen.

8.9.1 - Torque control and angle monitoring

Loosening with torque control and angle monitoring is used when you want to keep up a small constraint in the assembly.



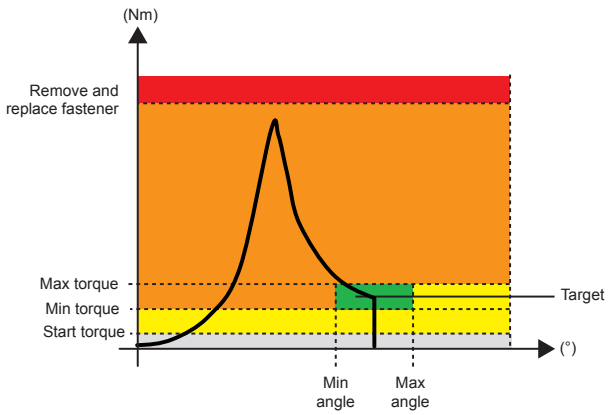
Parameters

Breakaway torque	starts the torque measure.
Loosening threshold	starts the angle measure.

Stop conditions
IF Torque > Abort torque OR IF Torque > Breakaway torque (after relaxation) OR IF Torque ≥ Target torque

Report OK	IF Min torque < Final torque < Max torque AND IF Min angle < Peak or Final Angle < Max angle.

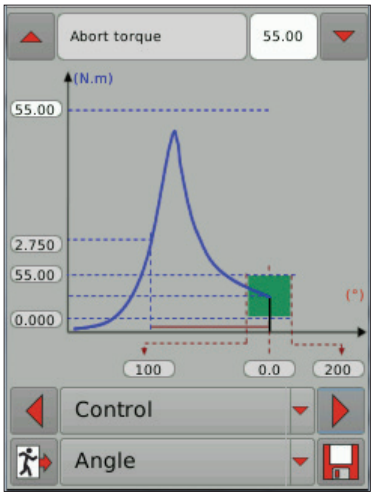
For each channel, the 3 report controller LEDs will light according to the following diagram.



Result data	Final torque Peak OR Final angle

8.9.2 - Angle control and torque monitoring

Loosening with angle control is mainly used to release the constraints in the assembly. When this strategy is selected, the torque and the angle are monitored automatically.



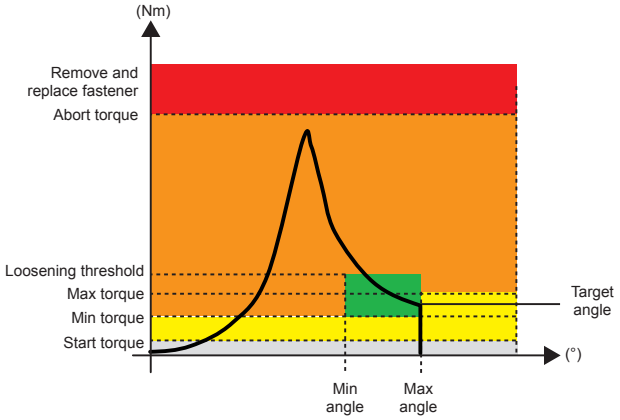
Parameters

Loosening threshold	Start the angle measure.
Target angle	Loosening angle expected.

Stop conditions
IF Torque > Abort torque OR IF Torque ≤ Target angle

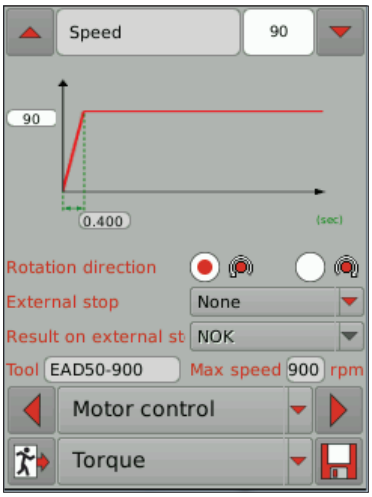
Report OK	IF Min torque < Final torque < Max torque AND IF Min angle < Peak or Final angle < Max angle

For each channel, the 3 report controller LEDs will light according to the following diagram.



Result data	Final torque Peak OR Final angle

8.9.3 - Motor control - loosening



- Tap the screen and fill in the values.
- speed
- acceleration time

- Tap the "Save" icon to save and quit the screen.

8.10 - Prevailing

The prevailing step allows you:

- to check the residual torque (prevailing torque) of a mechanical assembly (e.g. gearboxes, crankcases).
- to know if there is a mechanical "hard" spot in the assembly.
- to detect the absence of a component in the joint (e.g. crankshaft or connecting rod bearing shell, gear, control of the friction torque of a Nylstop nut), when the residual torque is lower than the min. torque.

- Tap "Strategy".

- Select the type of strategy:

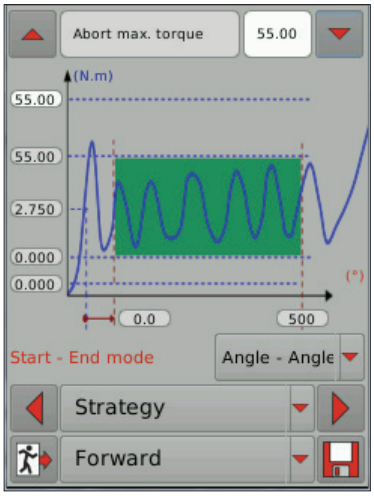
8.10.1 - Forward prevailing

In a forward prevailing step, the start and stop can be controlled by angle.

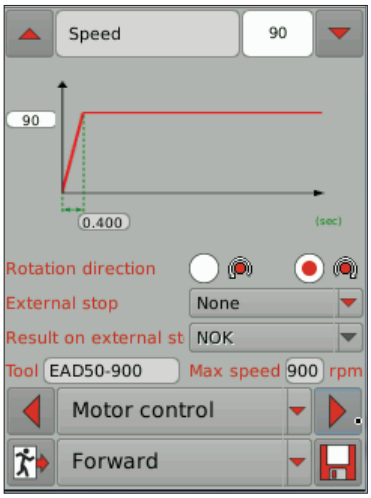
This allows you to eliminate the "shock" when starting motor and mechanism.

- The torque is measured from start.
- The angle is measured from a prevailing threshold.
- The torque value is monitored from a start angle value up to an end angle value.
- The prevailing torque value must lie between min. and max. torque.

The stored results include the min. and max. torque values and the average value of the torque measurements during the acquisition phase. The system stops the acquisition of the torque and angle values when the motor stops. The torque pulse at the motor stop is not taken into account.



8.10.2 - Motor control - forward prevailing

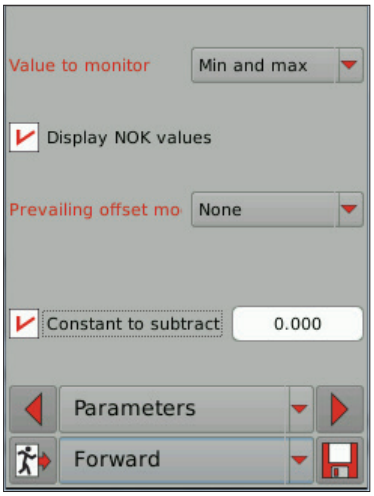


- Tap the screen and fill in the values.
- speed
- acceleration time

- Select the Rotation direction: Clockwise / Counterclockwise.
- For the settings of the "External stop to next step" option, refer to chapter 8.8.
- Tap the "Save" icon to save and quit the screen.

8.10.3 - Prevailing parameters

- Tap "Parameters".



- Select the prevailing torque value to monitor:

average	The report is OK when the mean of all torque values during the measuring period is between "min torque" and "max torque".
min	The report is OK when the lower torque value during the measuring period is between "min torque" and "max torque".
max	The report is OK when the higher torque value during the measuring period is between "min torque" and "max torque".
min and max	The report is OK when all torque values during the measuring period are between "min torque" and "max torque". • Tick "Display NOK values" to store and display min. or max. torque measurement in case of NOK report.

By default, the prevailing torque average value is displayed and stored.

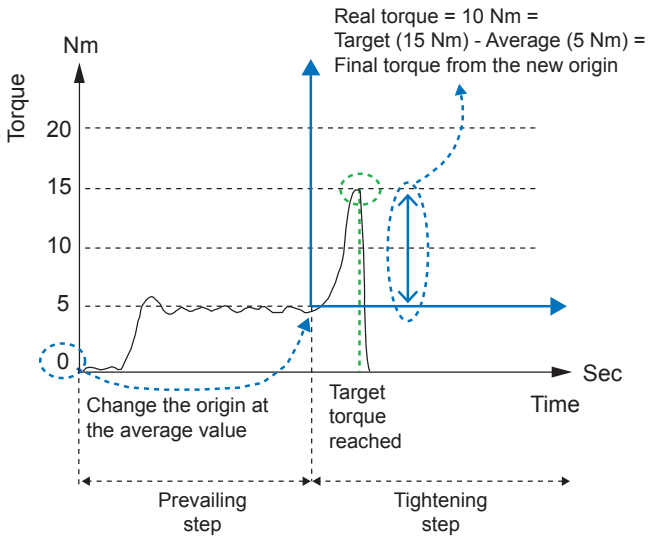
Option 1 - Prevailing offset mode

- Select the "Prevailing offset mode": none/add/substract.

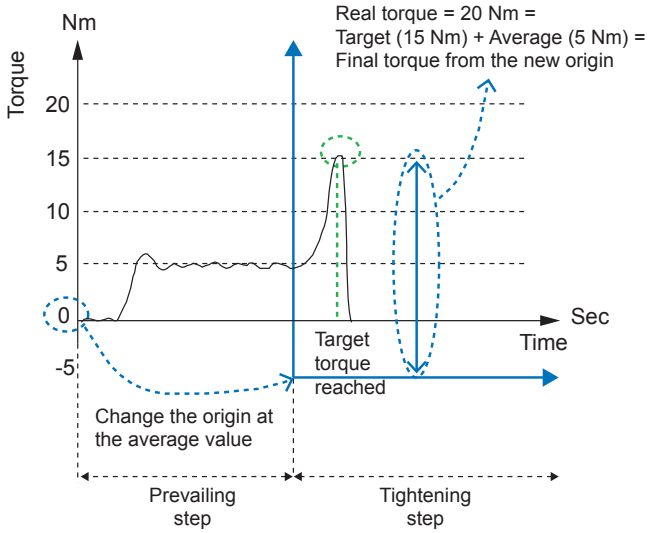
The average value of the prevailing torque is used as an offset to be added or subtracted from the torque transducer reading for the next steps of the Pset.

Step settings and values are not changed. The offset is applied to the torque transducer reading.

Prevailing and Tightening - Add offset (without constant)



Prevailing and Tightening - Subtract offset (without constant)



For the next steps of the Pset, it will be possible to reset the applied Prevailing torque offset by ticking "Offset reset" in the screen "8.6 - Monitoring & options".

Option 2 - Constant to "Substract"

- Tick "Constant to substract" and enter a torque value which will be subtracted from the torque transducer reading at the beginning of the Prevailing step.

For the next steps of the Pset, it will be possible to erase this constant offset from the torque transducer reading by ticking "Offset reset" in the screen "8.6 - Monitoring & options".

- Tap the "Save" icon to save and quit the screen.

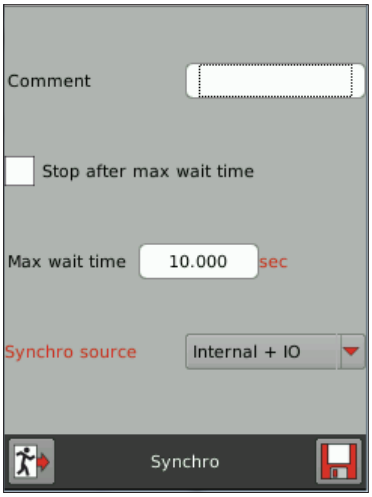
8.11 - Synchro step

The "Synchro" step is used to synchronise the steps of several tools driven by a common tightening unit (internal) or by different controllers (I/O).

- To sync several controllers, program Synchro steps for each controller and use the "Synchro in" and "Synchro out" I/O events to connect physically the controllers together (via 24 V I/O).

- Refer to "Appendix - CVI3 connections" to get more information.

- Tap this icon to edit the step.



- Enter a comment (up to 100 characters).
- Enter the max. wait time of the Synchro step. When this time is reached, the tools will stop and the report is NOK.
- Tick "Stop after max. wait time".
- Enter the synchro source:

internal	between the tools of a tightening unit.
internal + IO	between the tools of a tightening unit and with the other tools of other controllers (via the 24 V I/O).

- For further information, contact your Desoutter representative for support.

- Tap the "Save" icon to save and quit the screen.

9 - ASSEMBLY PROCESS PROGRAMMING

Path: Main menu / Configuration / Assembly Process

An Assembly Process is commonly called AP and shown by this icon.

An Assembly Process is the set of one or several assembly actions to proceed in a defined order.

Each assembly action consists of a Pset to execute a certain number of times called "batch".

The Assembly Process describes the workflow to assemble parts and has 3 phases:

Start conditions	Assembly Process selection by I/O, Fieldbus, Open Protocol, etc...
Process	Sequence of tightenings which is using Psets as tightening recipes. Assembly actions can be executed in a forced sequential order or a free parallel order.
Post processing	Post-processing actions are to be executed when the AP is finished or aborted.

	to delete an Assembly Process
	to quit without saving

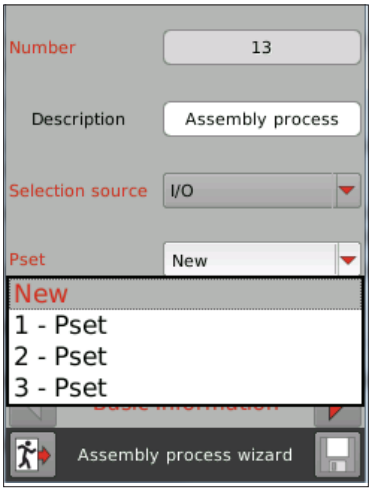
9.1 - How to create an Assembly Process

	• Tap this icon to create an Assembly Process.

The AP number is automatically selected.

- Click the "Description" label to display the text keyboard.
- Enter a description (up to 40 characters).

- Select the source which will start the Assembly Process.
- Select the Pset number: new or already existing

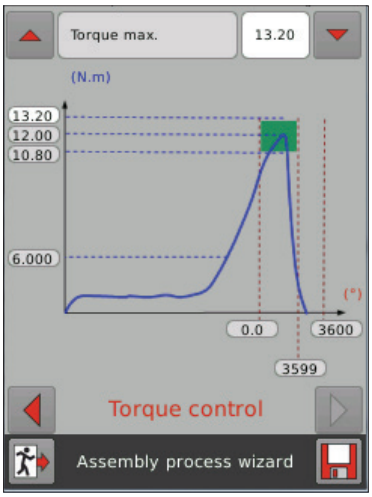


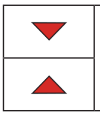
- Create the list of Psets as described previously in this manual.
- Enter the batch size: 1-99 or unlimited.

	• Tap this key to display the next screen.

- Enter a name (up to 40 characters).
- Enter the target torque. Click the label and write the text by using the digital keyboard.

	• Tap this key to display the next screen.



	• Scroll the parameters by using these icons.

- Fill in the values.
- Tap the "Save" icon to save and quit the screen.

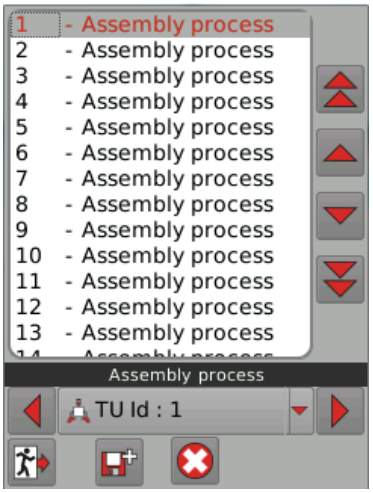
9.2 - How to view the list of Assembly Processes

Path: Main menu / Configuration / Assembly Process

- Tap this icon to view the list of Assembly Processes.

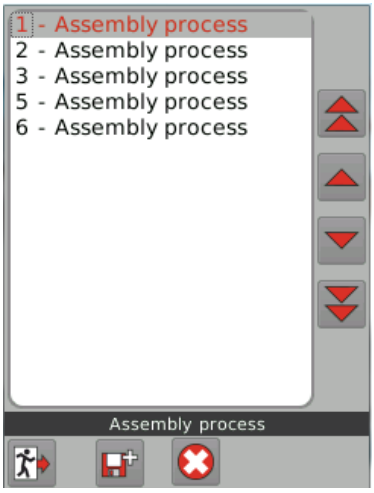
9.2.1 - Asynchronous mode

The list of Assembly Processes can be different per Tightening Unit.



9.2.2 - Synchronous mode

The list of Assembly Processes is common for both tools.

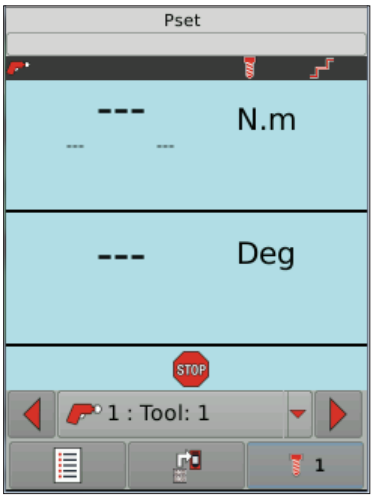


- Launch CVI CONFIG software to edit and change the Assembly Process settings.
- For more details, refer to CVI CONFIG user manual available at **http://resource-center.desouttertools.com.**

10 - MONITORING

10.1 - Main screen

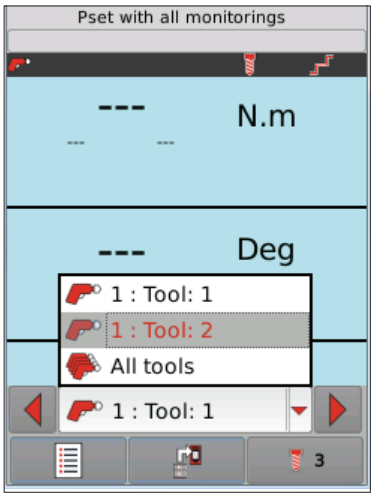
When the controller is powered on, the following screen is displayed:



Pset	Pset name	from the last result
	Tool serial number	
	Pset ID	
	Number of the last step executed	
1	The Running mode of the tightening unit is "Pset". Pset 1 is selected. • Start the operation. • Tap the icon to select another Pset.	
1	The Running mode of the tightening unit is "Assembly Process". Assembly Process 1 is selected. • Tap the icon to select another AP. The programming of Assembly processes is possible with CVI CONFIG only. The batch count is displayed on the top right of the screen. When data are transferred from CVI CONFIG, the controller must be in the Monitoring screen mode.	
	• Tap this icon to display the Monitoring view menu.	
	• Tap this icon to display the main menu.	

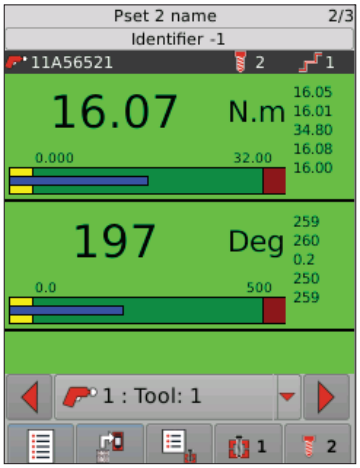
After each operation, the report is displayed. It can be OK or NOK.

10.2 - Display change/Tool selection



	• Use these icons to change the display. - Tool 1 - Tool 2 - All tools

10.3 - Report OK

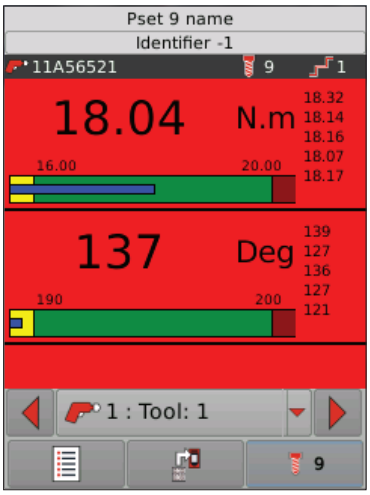


The report is OK: the operation is complete.

Additionally to the main screen, the following information is displayed:

Batch status	The batch status is displayed only when an Assembly Process is selected. Example: 2/3
Tightening unit name or Identifier saved in position 1 of the result	
Tightening unit comment	

10.4 - Report NOK



The report is NOK: the operation is not sucessful.

Some more icons may be displayed to explain why.

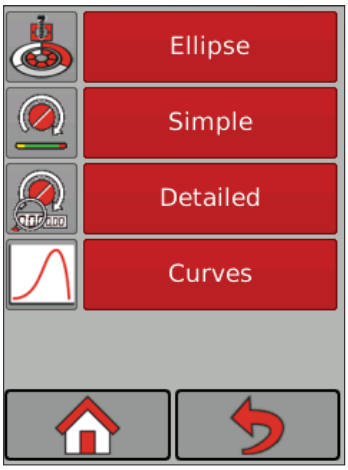
	Tool lock icon	The tool is locked
	Reverse icon	A run reverse has been performed.

When the report is NOK, you may need to modify the settings and return to the main menu.

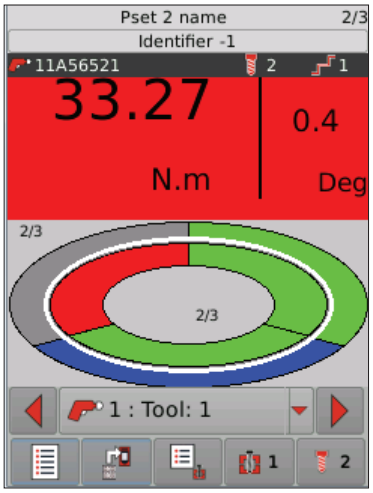
	Main menu	• Tap this icon to access the configuration or maintenance menus.

10.5 - Monitoring view menu

Both OK and NOK screens can be displayed in different types of views:



10.5.1 - Ellipse view (in Assembly Process running mode only)



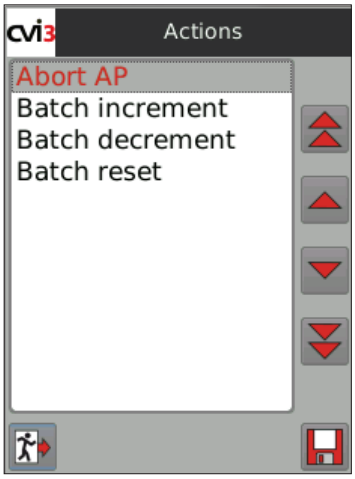
The diagram shows the different steps performed during the Assembly process operation.

The outer ellipse represents the whole Assembly Process divided in assembly actions. In this example, the part in green is complete and the report is OK, the assembly action in blue is running and the grey part will be the next step.

At the top right, the figure shows the actions status.

The inner ellipse represents the batches. A batch is the number of times that a Pset is executed. In this example, 2 tightenings out of 3 are completed.

• Tap this icon to display the list of actions which can be done on the assembly.

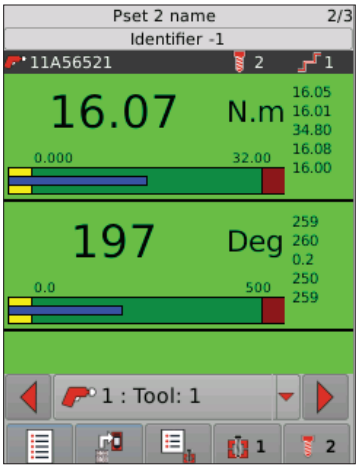


Icon	Description	Action
	Abort AP	to stop the complete Assembly Process
	Batch increment	to skip one bolt
	Batch decrement	to redo the last bolt
	Batch reset	to restart the complete batch

The batch report will be OK or NOK according to the programming of the "batch count type" and "Forced batch status" features. Refer to CVI CONFIG user manual, chapter "11.5 - Assembly action".

10.5.2 - Simple view

- Tap "Simple" to display the screen:



The following values are displayed:

- Min. and max. torque
- Min. and max. angle

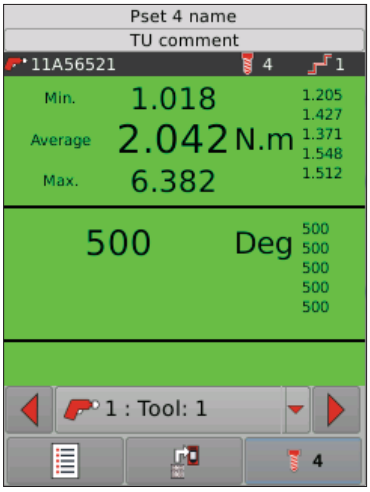
yellow	low zone	Torque/angle below torque min/ angle min.
green	zone OK	Torque/angle within acceptance window
blue	result	Measured values
red	high zone	Torque/angle above torque max/ angle max.

The torque and angle values are displayed as well as the last 5 torque and angle values.

- Tap the screen to return to the monitoring view menu.

10.5.3 - Simple view - prevailing step

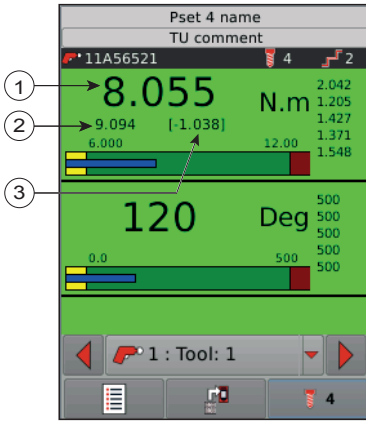
Last step - prevailing



The following measurements are displayed:

- Min. prevailing torque
- Average prevailing torque
- Max. prevailing torque

Prevailing and tightening



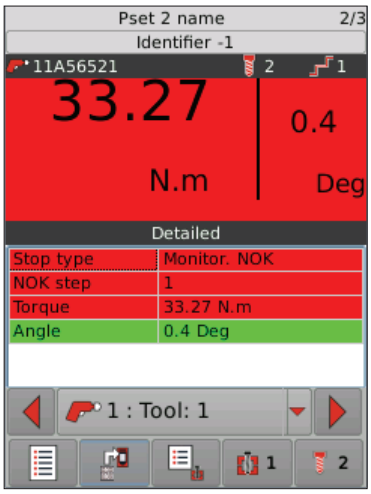
Legend

1 Target torque
2 Real torque
3 Offset applied

- Refer to chapter to "8.8 - Prevailing" get more information about the prevailing step.

10.5.4 - Detailed view

- Tap "Detailed" to display the screen:



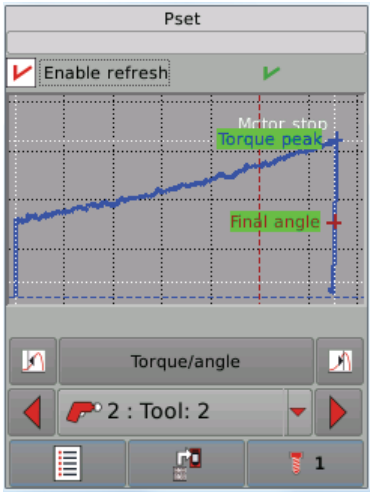
When the report is NOK, the following information is displayed:

- stop type
- NOK step number
- monitorings NOK

- Tap the screen to return to the monitoring view menu.

10.5.5 - Curve view

- Tap "Curve" to display the screen:



The curves available are:

- Torque vs Angle
- Torque vsTime
- Angle vs Time
- Current vs Time
- Speed vs Time

- Tick "Auto refresh" to keep refreshing the curve after each operation.

	Use this icon to point to the first value on the left. Keep pressing the icon to follow the curve.
	Use this icon to point to the first value on the right. Keep pressing the icon to follow the curve.

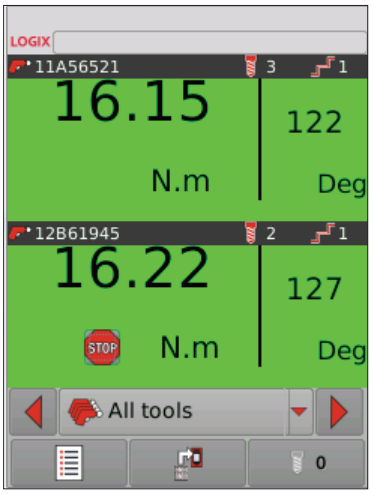
The markers show remarkable samples.

The white cross shows the current sample.

- Use the dot lines to navigate on the curve.
- Tap the screen to return to the monitoring view menu.

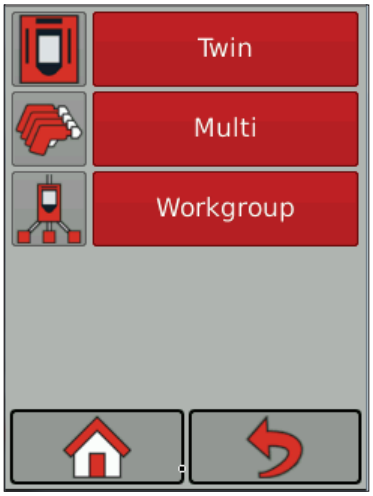
10.6 - "All tools" display

The following screens are available when more than one tool is connected to the controller.



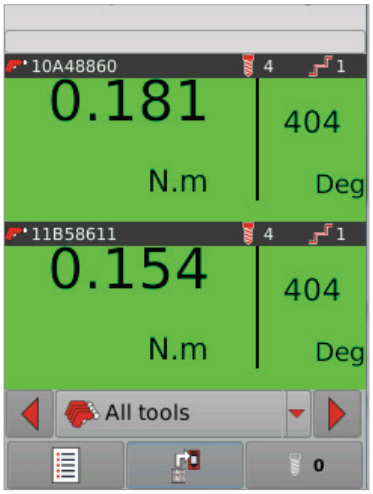
Both tools results are displayed.

- Tap this icon to view other displays.



10.6.1 - Twin

This screen shows the results of both tools.

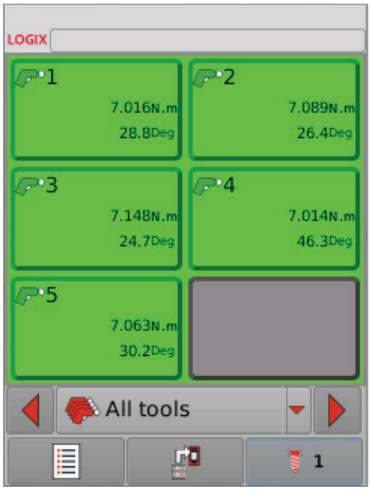


10.6.2 - Multi

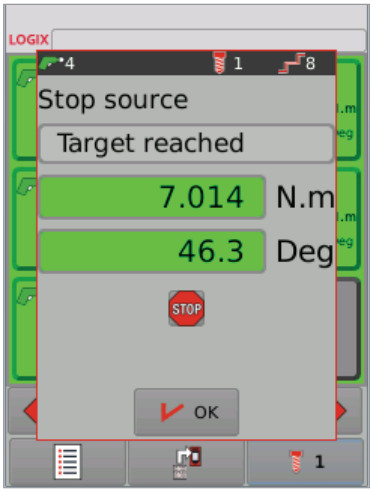
This screen shows the list of results of all connected tools.

10.6.3 - Workgroup

This screen shows several tiles corresponding to each tool of the workgroup.



- Click any tile to display its detailed information.



10.7 - User info code

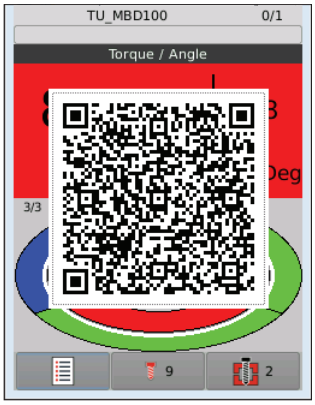
When an error occurs, a message is displayed on the monitoring screen.

For example:

- Press the icon to display the resolution procedure.

- Refer to "Appendix - User info codes" to get more information.

- Tap the "Bar code" icon on the top right. The following screen appears:



The QR code (Quick Response code) is displayed.

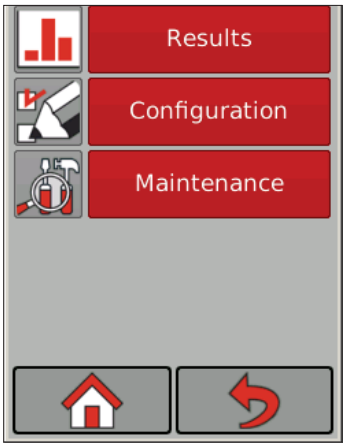
- To get support from Desoutter, use one of the applications in the table below to open the Web page and follow the instructions.

Mobile/OS	Application name
Iphone	ScanLife
Android	QuickMark
Blackberry	QR code scanner pro

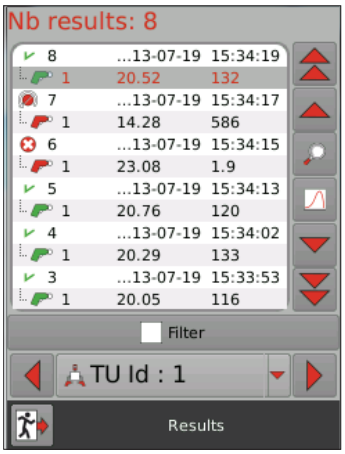
- Tap the "Stop" icon on the top left to hide the user info.

11 - RESULTS

- Tap "Results" on the main menu.



The following screen is displayed:



Up to 10,000 results can be saved.

- Select and tap one result, then tap this icon to display its details

- Use the arrow buttons to scroll through the list.

11.1 - Main screen description

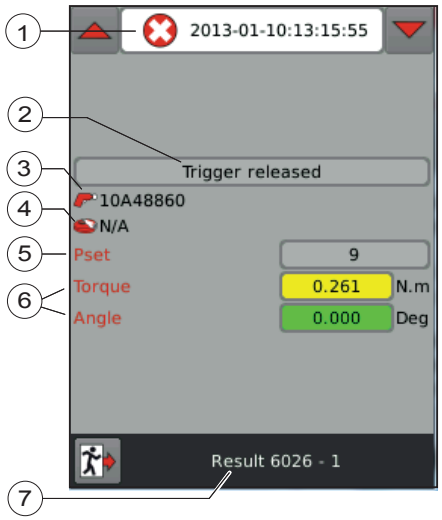
	Report OK - The operation is complete
	Report NOK - The operation is not successful.
	Run reverse
	Batch increment
	Batch decrement
	Tool report OK
	Tool report NOK
1	Tool no. 1
2	Tool no. 2
1st column	Torque value
2nd column	Angle value

11.2 - Detailed view

- Use the arrow buttons to scroll through the list.

- Select and tap one result, then tap this icon to display its details

For example:

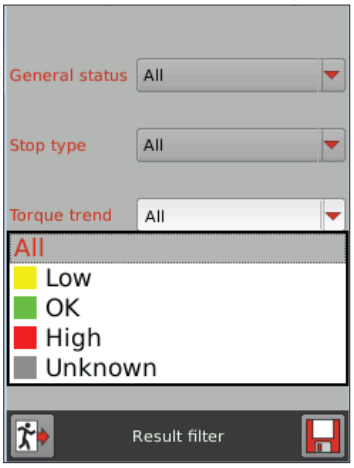


Legend

1 Report status and date/time
2 Stop source
3 Tool serial number
4 Cable serial number
5 Pset ID
6 Torque & angle values - Monitoring status
7 Result ID - Tool ID

11.3 - Filter

- Tick "Filter" to display this screen:

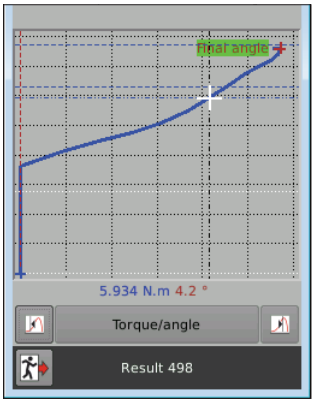


- Select the filters, tick "Filter enabled" and press the "Save" icon to save the selection.

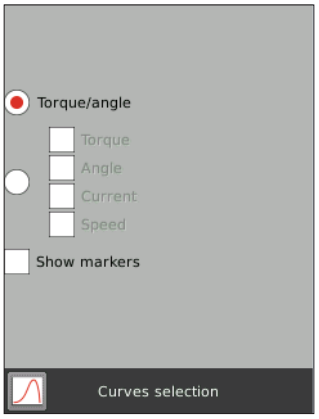
Color	Trend
yellow	Low torque, low angle
green	Torque OK, angle OK
red	High torque, high angle
grey	Unknown

11.4 - Curve

	• Select a result and tap on this icon to display its curve. It may happen that there is no curve because the results are not representative.
	• Use this icon to zoom the first value.
	• Use this icon to zoom the last value.



- Touch and slide from top left to bottom right to zoom in a particular area.
- Tap the middle of the screen to zoom out.
- Tap "Torque Current" field to select the display parameters

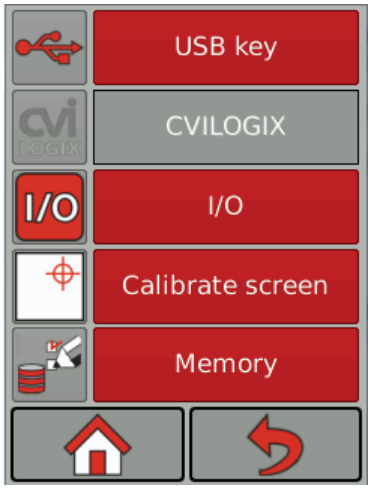


Ticking "Show markers" will allow you to better interpret the curve.

- Tap this icon to view the new curve display.

12 - MAINTENANCE

12.1 - Controller



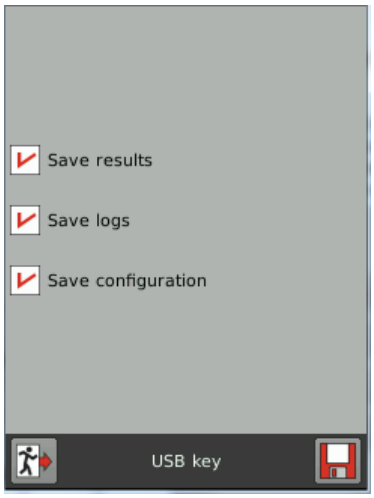
12.1.1 - USB key - Firmware upgrade

Path: Main menu / Maintenance / Controller / USB

No.	Action
1	• Copy the ".cvi3" image to the root of your USB key. Be careful, you must have 1 ".cvi3" image only on your USB key.
2	• Copy the ".cvi3.md5" file to the root of your USB key. • Be sure you have one ".cvi3.md5" file only with the same release number on your USB key.
3	• Plug the USB key to the front panel port.
4	• Tap "Upgrade SW".
5	The controller will beep during 2 seconds and the LEDs will be blinking during the update.
6	• Wait for the automatic reboot. The update lasts from 5 to 10 minutes. • Do not switch off the controller.
When over, the green LED is on during 10 sec and there is an automatic reboot. You can restart manually your controller if you want.	
In case of error, the red LED is on and the controller does not reboot:	

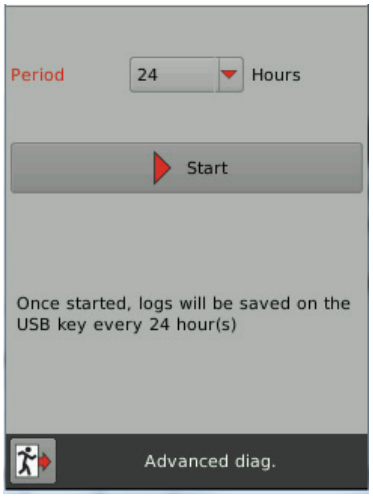
No.	Action
a	• Reboot manually the controller with the USB key connected.
b	The controller goes in a recovery mode and restarts steps no. 5 and 6.
c	• If the red LED is on again, contact "cvi3_support@desouttertools.com"
7	• Check the new release number is correct by tapping "Main menu / Maintenance / Version".

12.1.2 - USB key - Save



- Plug a USB key into the front panel port.
- Save your data: results / logs / configuration.

12.1.3 - USB key - Advanced diagnostic



- Plug a USB key into the front panel port.
- Select how often the logs are saved on the USB key.

Period	1/2/6/12/24 hour(s)

- Click "Start".

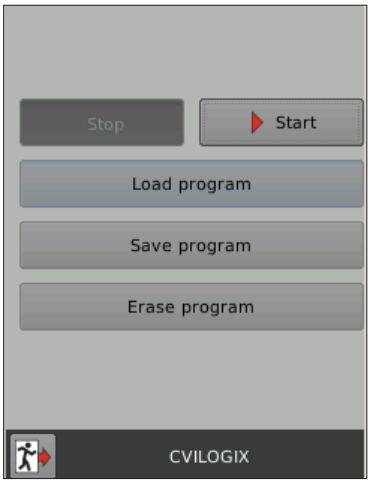
- Do not unplug the USB key from the front panel.

12.1.4 - CVILOGIX

Path: Main menu / Maintenance / Controller

Pre-requisite:

- ePOD including the CVILOGIX function
- USB key including your own CVILOGIX program.
- Plug in the ePOD on the bottom panel.
- Plug in the USB key on the front panel.



LOGIX The CVILOGIX logo is activated and displayed on the top left of the monitoring screen.

- Tap "Load program.
- Tap "Start" to launch the program.

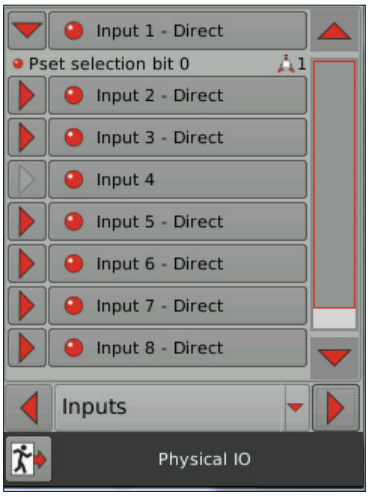
LOGIX The CVILOGIX program is running and the logo turns green.

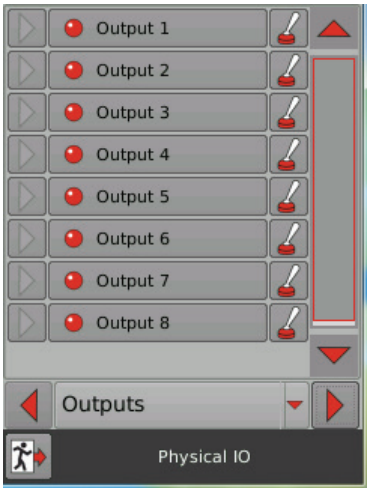
- Tap "Save program" to save the program on any USB stick connected to the controller front panel.

- For further information, contact your Desoutter representative for support.

12.1.5 - Physical I/O configuration

Path: Main menu / Maintenance / Controller / IO





- For more information about how to assign events to physical I/O, refer to the CVI CONFIG user manual at **http://resource-center.desouttertools.com.**

	I/O ON
	I/O OFF
	I/O events are associated to physical I/O. • Click to display the assignment.
	I/O events are not associated to physical I/O.
	To activate this function, you need to have a USB stick with the right profile (configured with the Desoutter CVIKEY software). • If not, contact your CVIKEY manager for support. • Click this icon to switch the action.

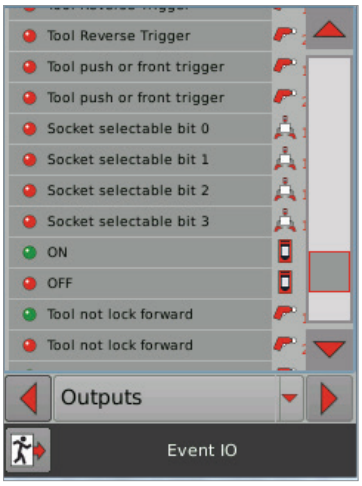
- Use the left, right or down arrow keys to navigate from one screen to another.
- Use the scroll bar to navigate in the screen.
- Tap the "Save" icon to save and quit the screen.

When the application needs a larger number of I/O, it is possible to connect I/O expanders on the eBUS network.

- Refer to "Appendix - CVI3 I/O and events" to get more information.

12.1.6 - Event I/O programming

Path: Main menu / Maintenance / Controller / IO



	I/O or event ON
	I/O or event OFF

The goal is to associate I/O events to the controller physical I/O. Some of the most frequently used events are already assigned.

I/O events can be classified as follows:

	I/O dedicated to a tightening unit.
	I/O dedicated to a tool.
	I/O dedicated to a controller

- Use the left, right or down arrow keys to navigate from one screen to another.
- Use the scroll bar to navigate in the screen.
- Tap the "Save" icon to save and quit the screen.

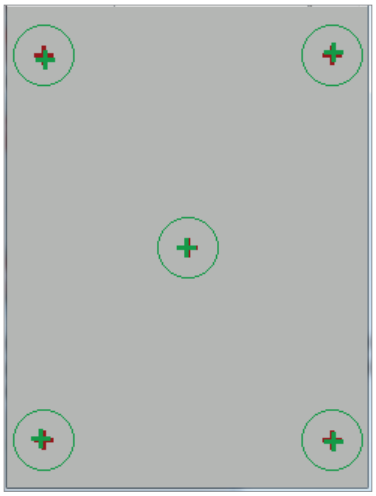
- Refer to "Appendix - CVI3 I/O and events" to get more information.

12.1.7 - Calibration of the controller screen

Path: Main menu / Maintenance / Controller

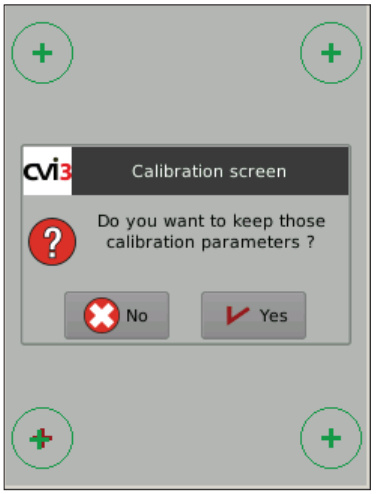
Calibration is necessary when the controller is powered on for the first time.

- Tap on "Yes" to display the calibration screen.
- Tap each of the 5 crosses.



The controller will automatically re-calibrate the screen: the green crosses must be over the red ones as accurately as possible.

- Tap the screen.

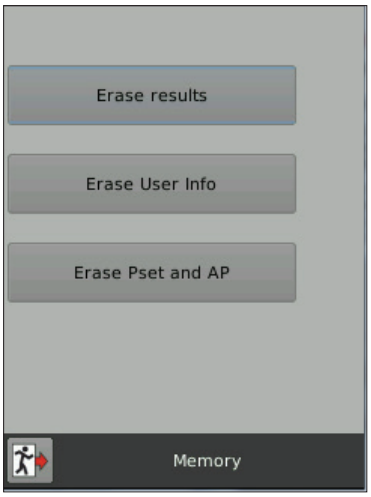


- Press "Yes" or "No" to save or not the new calibration parameters.

If no action is done within 10 seconds, the previous parameters are kept.

12.1.8 - Memory

Path: Main menu / Maintenance / Controller



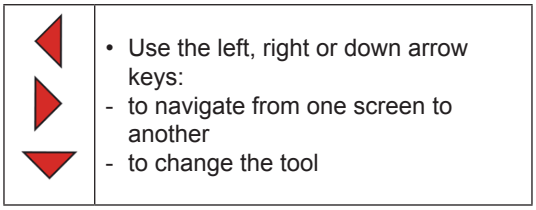
- Select and tap which type of information to erase from the controller memory:

- results
- user information
- Psets and Assembly Processes configurations

12.2 - Tool

12.2.1 - Tool identification / characteristics

Path: Main menu / Maintenance / Tool



- Use the left, right or down arrow keys:

- to navigate from one screen to another
- to change the tool

12.2.2 - Tool identification

- Enter a comment (100 characters).
- Tap the "Save" icon to save and quit the screen.

12.2.3 - Tool characteristics (read-only)

The characteristics of the tools are:

- Tool family
- Motor type
- Tool type
- Gear ratio

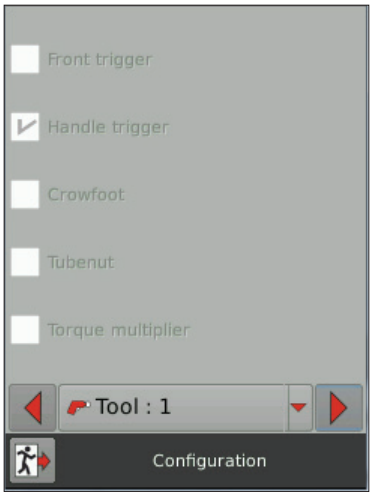
- Tap the "Save" icon to save and quit the screen.

12.2.4 - Tool configuration (read-only)

Path: Main menu / Maintenance / Tool

This screen shows the tool configuration (triggers, fixed accessories, etc...).

Available for Desoutter technicians only. It is mandatory to calibrate the tools after they have been modified.



- Refer to the CVIMONITOR user manual at **http://resource-center.desouttertools.com.**

12.2.5 - Tool monitoring

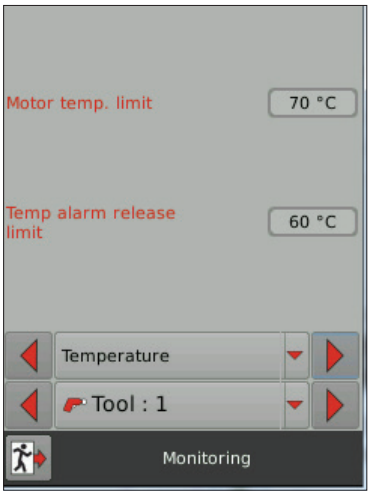
Path: Main menu / Maintenance / Tool

- Use the left, right or down arrow keys to navigate from one screen to another.

12.2.6 - Transducer

Calibration data are given per transducer and per tool.

12.2.7 - Temperature

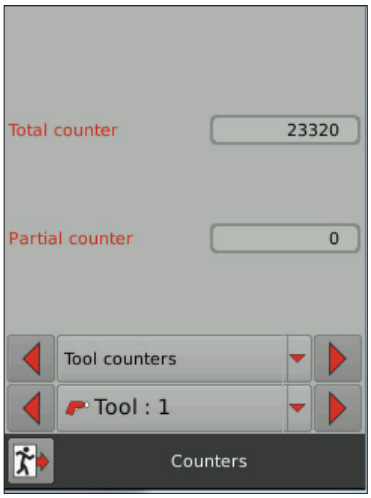


The following information are displayed:

- Motor temperature limit
- Temperature Alarm Release Limit

12.2.8 - Tool counters

Path: Main menu / Maintenance / Tool



Total counter	Number of tightenings and run reverses above the tool min. torque since the manufacturing date.
Partial counter	Number of tightenings and run reverses since the last reset by using CVIMONITOR.

- Use the left, right or down arrow keys to navigate from one screen to another.

12.2.9 - Maintenance alarms

- Launch CVIMONITOR software to reset the partial counters and change the parameters.

Pop-ups are automatically displayed to alert the user to perform maintenance.

- Refer to "Appendix - CVI3 Spare parts" to get more information.

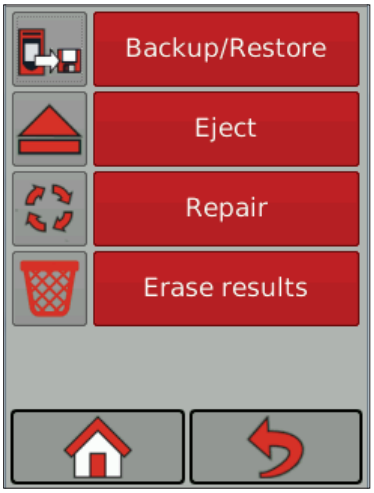
12.3 - ePOD

Path: Main menu / Maintenance

- Plug in the ePOD to the controller.

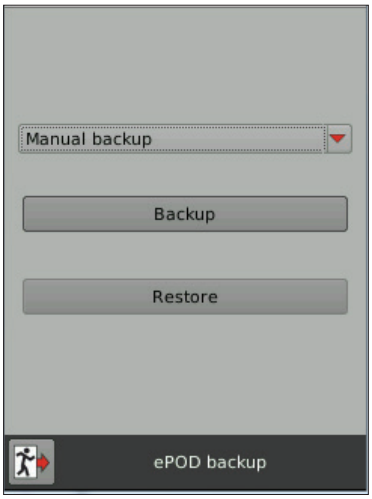
  - For more information about installing the ePOD, refer to the installation manual" part no. 6159931050 at **http://resource-center.desouttertools.com.**

- Go to the "Maintenance" menu and tap "ePOD".



12.3.1 - Backup/Restore

- Tap "Backup/Restore".



Manual backup	The ePOD is a snapshot of the controller.
Auto backup	Each modification is saved in real-time in the ePOD. The ePOD acts as the controller mirror.

- Press "Backup" to start the process.
- Press "Restore" to transfer the data from the ePOD to the controller.

12.3.2 - Eject

This command is mandatory to unplug the ePOD from the controller.

- Tap "Eject" before disconnecting the ePOD.

12.3.3 - Repair

- Tap "Repair" to start a recovery attempt of the data and results from the ePOD.

12.3.4 - Erase results

- Tap "Erase results" to erase all results stored in the ePOD.

12.4 - User information

Path: Main menu/Maintenance

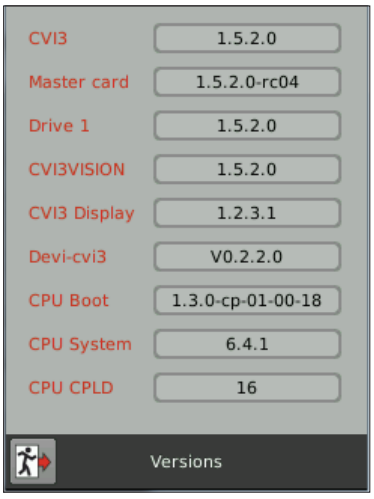
- Use the Filter to classify the user info codes:
- Info
- Warning
- Error

Tap this icon to view the details of the event.

Refer to "Appendix - User info codes" to get more information.

12.5 - Hardware and firmware versions

Path: Main menu/Maintenance/



This information is useful to exchange information with Desoutter Servicing.

- Refer to chapter 12.1.1 to update the controller.

1 - CVI3 LOGICAL OUTPUTS

Name	Description	Rising condition	Falling condition
General status			
Ready	All tools of a tightening unit are ready to run. Turned on when no error conditions (failures or warnings). Check that it includes the control the Servo DC bus. This output does not take into account the spindle validation (i.e. even if no tool is validated, this output will raise).	- No Error in controller nor in tool	"- Quick stop activated - Error coming from tool (except torque or span error)"
Identifier OK	Identifier received (e.g. barcode) matches masks (stays during 0,5 s at active level).	Identifier received and identified	0,5 s after rising
Identifier NOK	Identifier received (e.g. barcode) does not match masks (stays during 0,5 s at active level).	Identifier received but not identified	0,5 s after rising
User info present	User info (Info, Warning or Error) is present.	User info present on screen	No user info on screen
Keep alive ack	This output is the copy of the "Keep alive" input. Can be used by the PLC to check the controller is still running.	When "Keep alive" input raises.	When "Keep alive" input falls.
Fieldbus Fault	No Fieldbus. The "Fieldbus fault" is on as long as the Fieldbus communication is not established. Switches off automatically when the communication works again.	Communication lost and/or keep alive missing.	Fieldbus communication established and keep alive present
Reporting Alarm	The value of "Reporting alarm" sets the level of the FIFO that triggers an alarm message (on display and I/Os). The controller is not locked by this alarm. The alarm informs on possible communication issues with the reporting protocol. Maintenance operators can solve the issue before the controller is locked (if option "Block is FIFO is full" is enabled), or before traceability of some results is lost (if option "Block is FIFO is full" is disabled).	FIFO threshold Alarm reached	FIFO under threshold alarm.
Open protocol activated	Open Protocol is activated in configuration	Protocol is enabled	Protocol is disabled
Open protocol connected	Open Protocol is connected on the Tightening Unit	At least 1 peer connected	No peer is connected
Time synchro done	Time synchronisation completed successfully using Fieldbus data (Q_SYN in VWXML)	-	-
Emergency stop	Emergency stop is activated	Emergency stop activated	Emergency stop deactivated
Tool status			
Tool ready	"The tool is ready to tight: - the tool is present and the controller is ready - a valid Pset has to be selected - the tightening strategy must cope with the tool"	Tool connected AND valid Pset.	Tool disconnection, Pset selection.
Tool not locked forward	There is no tool lock in forward direction.	Tool unlocked in forward direction	New lock in forward direction
Tool not locked reverse	There is no tool lock in reverse direction.	Tool unlocked in reverse direction	New lock in reverse direction
Tool running	The tool is running (CW or CCW, tightening or loosening).	Tool starts to run.	Turns off when the tool stops.
Tool direction	"Indicates if the tool is in tightening mode. Active: tightening mode Inactive: run reverse mode	Entering tightening mode.	Entering run reverse mode.
Tool tightening	Tool is running in tightening mode. Pset threshold is not taken into account.	Tool start in tightening mode.	Tool stops.
Tool middle course trigger	Reflects the raw state of tool middle course start trigger, independently from tightening unit state.	Middle course of main trigger is reached	Main trigger is completely released.
Tool main start trigger	Reflects the raw state of tool main course start trigger, independently from the tightening unit state.	Trigger is pushed.	Trigger is released
Tool reverse trigger	Reflects the raw state of tool reverse trigger, independently from the tightening unit state (reverse or forward).	Trigger is pushed.	Trigger is released
Tool push start or front start trigger	Reflects the raw state of tool push start or front start trigger, independently from the tightening unit state.	Trigger is pushed.	Trigger is released

Name	Description	Rising condition	Falling condition
Manual reverse in progress	The operator has selected the reverse direction on the tool and is running the tool.	Manual run reverse selected and trigger pushed.	Stays on as long as the operator is running the tool
Fastener loosened	There is a fixed minimum torque value to declare that the fastener was "loosened".	Run reverse Result generation.	New start (tool trigger or external start)
Tubenut open	Indicates that the tubenut is open. The tool can be removed from the assembly.	-	Tool running
Tool maintenance alarm	Reflects the different tool maintenance alarm state with or condition.	Tool maintenance alarm 1 or 2 is active.	No tool maintenance alarm is active.
Invalid spindle settings	Tool characteristics does not match Pset parameters (e.g. negative jog times or contradictions, torque over the maximum tool torque range, speed over the maximum tool speed, maximum tool torque range, etc…)	Pset selection or tool connection.	Tool disconnection or new Pset selected.
Span failure	When starting a tightening, before running the tool, the controller checks the torque span. "Span failure" indicates that the span drifts by ±3% or more, causing a tool lockout. This fault can be due to the torque transducer or the tool electronics. The only solution is to replace the tool.	Span failure detection.	Disconnecting tool or new check without fault.
Offset failure	Indicates the offset (0 point) drifts by 50 % of full scale or more. This error exists when, at the beginning of the Pset, the torque transducer is seen to have 50 % or more of full-scale torque prior to even starting the motor. With an "Offset failure", the controller cannot adequately compensate for this transducer error and, therefore, will not allow a tightening operation to occur. The only solution is to replace the tool.	Offset failure detection	Disconnecting tool or new check without fault.
Motor over temperature	Indicates that the temperature of the tool motor windings has exceeded the temperature threshold. An error message remains.	"Temperature threshold: - 100°C for fixed tools - 60°C for portable tools"	The signal turns off as soon as the temperature returns below the threshold (minus hysteresis = 10°C).
Angle measurement fault	Drive detected angle sensor fault. It can be an angle sensor fault, a tool electronic fault or a combination of both. The communication is tested permanently. As soon as the fault disappears, the signal turns off.	Angle fault detection.	Disconnecting tool
No tool connected	Indicates that the controller is not detecting the tool.	No tool connected or tool not recognized	Tool connected and recognized.
Pset status			
Pset selected bits (0..7)	Echoes the binary "Pset select bit 0 to 7" input if the corresponding Pset exits, echoes 0 if the Pset does not exist or there is no Pset selected.	New Pset selected	New Pset selected
Tightening running (old cycle declared)"	This indicates that the fastening operation has actually started: the tool is running and the torque is over the Pset start torque threshold. The signal switches off as soon as the fastening operation is finished (all reports sent).	Torque reach the cycle start threshold.	The fastening operation is finished (all reports sent)
Tightening finished	Indicates that a Pset report is available.	Result generation.	New start (tool trigger or external start) or reset input
Tightening OK	Indicates that the fastening operation (for a specific tightening unit) ends correctly and that all controlled and monitored tightening parameters are within tolerances.	Result generation.	New start (tool trigger or external start) or reset input
Tightening NOK	Indicates that the fastening operation (for a specific tightening unit) has failed.	Result generation.	New start (tool trigger or external start) or reset input
Spindle OK	Indicates that the fastening operation (for a specific tool) ends correctly and that all controlled and monitored tightening parameters are within tolerances.	Result generation.	New start (tool trigger or external start) or reset input
Spindle NOK	Indicates that the fastening operation (for a specific tool has failed.	Result generation.	New start (tool trigger or external start) or reset input
Angle low	Indicates a low angle reject. The angle must meet or exceed this value for a correct Pset. When the angle stays below this value, it becomes a "Low angle reject" and this output is turned on. Stays on until a new fastening operation starts.	Result generation.	New start (tool trigger or external start) or reset input

Name	Description	Rising condition	Falling condition
Angle OK	Indicates a correct angle. The angle is inside the limits declared in the step.	Result generation.	New start (tool trigger or external start) or reset input
Angle high	Indicates a high angle reject. The angle must stay below this value to be a correct Pset. When the angle meets or exceeds this value, it becomes a "High angle reject". The tool will stop when this limit is reached and this output is turned on. Stays on until a new fastening operation starts.	Result generation.	New start (tool trigger or external start) or reset input
Torque low	Indicates the peak torque low reject. If the torque stays below the "Peak torque low limit" and results in a "Reject" Pset. This can happen when a Pset is prematurely finished, a thread strips out or when the Pset is automatically finished due to other error conditions, such as a High angle fault or when a Pset Time Monitor expires and causes the Pset to be terminated. Stays on until a new fastening operation starts.	Result generation.	New start (tool trigger or external start) or reset input
Torque OK	Indicates a correct torque. Torque is in inside limits declared in the step.	Result generation.	New start (tool trigger or external start) or reset input
Torque high	Indicates the peak torque high reject. When the torque meets or exceeds this value, this output is turned on and the results is NOK. Stays on until a new fastening operation starts.	Result generation.	New start (tool trigger or external start) or reset input
Yellow report on tightening controller	This output reflects the state of the controller yellow light.	Controller yellow light is on	New fastening operation starts
Green report on tightening controller	This output reflects the state of the controller green light.	Controller green light is on	New fastening operation starts
Red report on tightening controller	This output reflects the state of the controller red light.	Controller red light is on	New fastening operation starts
Lock on reject	"Indicates that a tool is locked out because of an incorrect tightening operation. The controller will not continue to run the tool depending on "lock on reject option " : - until the ""Error Acknowledge"" input is activated. - until a run reverse operation - until a loosening operation"	Tightening finished with bad result and option "lock on reject" activated.	Input "Error acknowledge" activated or runreverse operation or loosening operation.,
Remove fastener	Indicates that the fastening operation resulted in a torque that exceeded the "Remove Fastener" setpoint. When correctly set, this means that the torque for any reason becomes very high. There is a risk that the fastening operation is not reliable: disassemble the joint and check parts.	Result generation.	New start (tool trigger or external start) or reset input
Tightening finished without timeout	Indicates that a Pset report is available and the source stop is not overall timeout.	Result generation.	New start (tool trigger or external start) or reset input
Overall time reached	Max overall time has been reached during tightening	Result generation.	New start (tool trigger or external start) or reset input
Synchro out	Synchro output : set to 1 when running step starts, reset to 0 when a synchro step is reached.	Start of running step.	Synchro step reached
Invalid parameter set selected	Indicates the Pset is disabled (has not been set).	Pset unselection	Pset selection
Assembly Process status			
Assembly Process selected bits(0..7)	Indicates the Assembly Operation per tightening unit currently selected (Bit 0..7).	New AP selected. AP aborted	New AP selected. AP aborted
Assembly process running	Indicates the assembly operation is being processed. The signal is on as long as the assembly operation is running. The signal falls down when the assembly operation is finished.	Assembly process start.	Assembly process finished or aborted.
Assembly process finished	Indicates when an assembly operation is finished.	Assembly process finished.	A new Assembly Process start or reset input

Name	Description	Rising condition	Falling condition
Assembly process OK	Indicates when an assembly operation is completed with no rejects. The signal stays on until a new Assembly process starts.	Assembly process finished and OK.	A new Assembly Process start or reset input
Assembly process NOK	Indicates when an Assembly process reject occurs. Stay on until a new Assembly process starts.	Assembly process finished and NOK or aborted.	A new Assembly Process start or reset input
Assembly process aborted	When an Assembly process has been aborted, "Assembly process aborted" is activated. Stays on until a new Assembly process starts.	Assembly process aborted.	A new Assembly Process start or reset input
Current batch count bit (0..6)	Bit indicator of current batch count	Batch count increment	when batch is finished, New start (tool trigger or external start) or reset input or new AP selection
Remaining batch count bit (0-6)	Bit indicator of the number of bolts remaining in the batch	Batch count increment	When batch is finished, New start (tool trigger or external start) or reset input or new AP selection
Batch running	A batch process is underway. The output is set to 1 before the first tightening operation.	A batch operation is enabled	Batch is finished or reset input
Batch finished	Indicates when the batch count equals the batch size and the batch is declared finished. It is used together with "Batch OK" to indicate the status of a batch.	Batch is finished.	New start (tool trigger or external start) or reset input
Batch OK	Indicates the status of the batch together with the "Batch finished" output (managed by Assembly Process).	Batch is finished and OK.	New start (tool trigger or external start) or reset input
Batch NOK	Such as when the batch gets aborted…or in the case rejects are included as part of the batch count (managed by Assembly Process).	Batch is finished and NOK. A new AP has been selected.	New start (tool trigger or external start) or reset input
External outputs AP			
External Out AP bit	Outputs that can be set or reset within an Assembly process	Depending of AP behavior	Depending of AP behavior
External outputs PLC			
External Out PLC bit (0..9)	Indicates this output is controlled by a PLC via Fieldbus (like a remote I/O). On PLC side, it is an output.	Depending on PLC behavior	Depending on PLC behavior
External outputs OP			
External Out OP bit (0..9)	Outputs dedicated to Open Protocol.	Depending on OP behavior	Depending on OP behavior
Socket tray			
Socket selectable (0..4)	24 V socket trays (BSD). Informs which socket can be taken by the operator.	A new socket has to be taken by the user.	No socket to be taken by the user.
Customized protocol Status			
Customer protocol activated	A customer protocol has been activated in configuration	Protocol is enabled	Protocol is disabled
Customer protocol connected	The activated customer protocol is connected	Protocol is connected	Protocol is disconnected
Customer protocol reporting alarm	The activated customer protocol has declared an alarm about result reporting of this Tightening unit.	Alarm is raised	Alarm is cleared
Q_SAS	ACK start tightening job	-	-
RDY	Controller ready	-	-
Q_LSN	Reverse disabled	-	-
WGZ	Tool disabled	-	-
Q_EDZ	Result and reports reset	-	-
Q_XMS	XML data transfer completed	-	-
EIO	Result OK	-	-
ENO	Result NOK	-	-
FSCIO	Group status OK		

Name	Description	Rising condition	Falling condition
FSCNIO	Group status NOK	-	-
CVILOGIX			
External Out CVILogix bit (0..100)	Indicates that this output can be used by an internal CVILOGIX application.	-	-
Miscellaneous			
ON	On state, used to set level "1" to physical outputs.	At controller startup.	Never falls
OFF	Off state, used to set level "0" to physical outputs.	At controller startup.	Never falls

2 - CVI3 LOGICAL INPUTS

Name	Description	Status
General commands		
Start stop Tightening on state	Initiates a fastening cycle if : - the "Spindle validation forward" is active and required by the tightening unit, - a Pset is selected.	State
Toggle start stop tightening on edge	This input is enabled for fixed tools only (tools without trigger). Initiates or ends a fastening cycle. A cycle can be initiated only if : - the "Spindle validation forward" is active and required by the tightening unit, - the Pset is selected.	Rising edge
Reverse direction	When activated, the tool green & red lights are flashing to indicate that the tightening unit reverse direction is selected. This signal status is not controlled during a tightening but only when tool is not running.	State
Error acknowledge	Enables the "Reject lockout" function. When locked out, the tool cannot run until this input is reset.	Rising edge
Reset	When "Reset" input raises (and there is no cycle running) : - defaults are acknowledged - batch counter of current Assembly Process is reset - reports lights on controller and tool are set off - the last result values on display stays readable - in Pset mode, Pset selected remains unchanged. In AP mode, AP is aborted. - ready output stay on When "Reset" input raises (and there is cycle running) : - tightening is immediately stopped - defaults are acknowledged - batch counter of current Assembly Process is reset - at tightening end, there is no report generated. - at tightening end, it is impossible to start a new tight, reset input must be released first. - in Pset mode, Pset selected remains unchanged. In AP mode, AP is aborted. - ready output stay on	State
Reset only status	Resets only : - Tightening OK/NOK - Spindle OK/NOK - Pset finished - Pset finished no timeout - Batch OK/NOK/Finished	State
Ack error message	Acknowledge error message displayed on HMI.	Rising edge
Force Pset mode	Forces the Tightening unit to switch in Pset mode in order to temporary run Psets (nothing saved). When AP mode + input state high, then switch to Pset mode. When Temporary Pset mode + input state low, then switch to AP mode. Other cases do nothing. Switching on the controller power with the input set will not switch to Pset mode.	State
Ack fieldbus result	Acknowledges the result present in PLC input. The tool is then unlocked and can tight again. This feature is dedicated to Fieldbus only	Rising edge
Keep alive	"Input used to check that the controller is still alive. State of this input is copied to ""Keep alive ack"" output. This input is also used by a PLC to inform the controller that Fieldbus communication is working."	State
Time Synchro Trigger	Execute date & time synchronisation from Fieldbus (SYN in VWXML protocol)	Rising edge
Enable access manager	Enable/disable access manager	State
Lock display	Lock/unlock the controller display.	State

Name	Description	Status
Restart controller	Reboots the controller.	Rising edge
Tools commands		
Spindle validation forward	Enables the tool forward direction. Note: the forward and reverse validation can be done by setting both validations on the same input. When the validation signal falls down, the tool stops.	State
Spindle validation reverse	Enables the tool reverse direction. Note: the forward and reverse validation can be done by setting both validations on the same input. When the validation signal falls down, the tool stops.	State
Reset tool locks	Reset tool locks, only the none safety tool locks will be affected	Rising edge
Tool stop	Stops the tool.	Rising edge
Tool blue light ctrl by IO	1 = Tool blue light is controlled by IO 0 = Tool blue light is managed by the controller	State
Tool blue light	If ""Tool blue light ctrl by IO"" is set to 1 then : 1 = tool blue light is set to on 0 = tool blue light is set to off	State
Tool green light ctrl by IO	1 = Tool green light is controlled by IO 0 = Tool green light is managed by the controller	State
Tool green light	If ""Tool green light ctrl by IO"" is set to 1 then : 1 = tool green light is set to on 0 = tool green light is set to off	State
Tool red light ctrl by IO	1 = Tool red light is controlled by IO 0 = Tool red light is managed by the controller	State
Tool red light	If ""Tool red light ctrl by IO"" is set to 1 then : 1 = tool red light is set to on 0 = tool red light is set to off	State
Tool yellow light ctrl by IO	1 = Tool yellow light is controlled by IO 0 = Tool yellow light is managed by the controller	State
Tool yellow light	If ""Tool yellow light ctrl by IO"" is set to 1 then : 1 = tool yellow light is set to on 0 = tool yellow light is set to off	State
Tool white light ctrl by IO	1 = Tool white light is controlled by IO 0 = Tool white light is managed by the controller	State
Tool white light	If ""Tool white light ctrl by IO"" is set to 1 then : 1 = tool white light is set to on 0 = tool white light is set to off	State
Pset commands		
Pset select bit (0..7)	Used to select Psets. These inputs must be in the desired state BEFORE the activation of the cycle start input. If the selected Pset is zero, there is no Pset selected.	State
Select previous Pset	Select lower number Pset.	Rising edge
Select next Pset	Select higher number Pset.	Rising edge
External stop abort Pset	"This input is used with proximity detectors to end immediately Pset running. The user can choose which state or transition will stop the Pset : No, Rising, Falling, Change, High, Low. When a Pset is aborted with this input, the Pset result is NOK.	Rising edge or state
External stop to next step	"This input is used with proximity detectors to end the running step. The user can choose which state or transition will stop the Pset : No, Rising, Falling, Change, High, Low. The user can also choose the step result when the stop request occurs: OK, NOK, Monitoring (Monitoring means that the result is computed depending on monitoring requested).	Rising edge or state
Synchro in	Step synchronisation input. The step starts when a transition to 0 is detected.	State
Assembly Process commands		
Assembly process selection bit (0-7)	Used to select an Assembly process. These inputs must be in the desired state BEFORE the activation of the assembly process start input. If the assembly process is zero, there is no assembly process selected.	Rising edge
Abort assembly process (tightening unit)	The "Abort assembly process" input stops the Assembly process being processed. The Assembly process is finished. The Assembly process result is memorized as "aborted" and "AP aborted" and "AP NOK" events are set.	Rising edge
Batch-1	The "Batch-1" input allows the operator to select the previous operation of a batch. The batch counter is decremented.	
Batch+1	In case you cannot finish the current operation of a batch, jump to the next one by using the external input "Batch+1". The action is declared as NOK and "Batch+1" event is set.	
Restart batch	Restarts the current batch of the current Assembly Process step. The "Restart batch" event is set.	Rising edge

Name	Description	Status
External inputs AP		
External in AP bit (0..9)	Inputs used in Assembly process in start conditions or in assembly actions sense input	Rising edge
External inputs PLC		
External In PLC bit (0..9)	"Indicates this input can be used by an PLC via Fieldbus (like a remote I/O). For PLC side, it is an input."	State
External inputs OP		
External In Open Protocol 1-8	Inputs used in Open Protocol. They can be monitored from the Open Protocol client by subscription. Theses DigIn are named "External monitored 1..8" in OpenProtocol specification.	State
Socket tray		
Socket lifted bit (0..4)	Used with CVI II controllers only : 24V socket trays (BSD). Informs which socket has been lifted.	State
Customized protocol commands		
PFCS END OF CYCLE	Input used in PFCS Chrysler to flush the result FIFO when the operator has completed the work	Rising edge
SAS	Starts tightening job	State
RST	Resets any running tightening job	State
LSN	Disables reverse	State
TOL	Tool validation	State
STR	Tool start	State
EDZ	Resets results	State
XMS	Synchronous XML	State
XMA	XML activated	State
CVILOGIX		
External In CVILogix bit (0..100)	Indicates that this input can be used by an internal CVILOGIX application	State

APPENDIX - USER INFO CODES

Code no.	Description	Resolution procedure
1	Tubenut open	1-Tubenut tool is detected as open
2	Tool connected	1- The tool is connected and correctly recognized by the controller.
3	No tool connected	1- Tool has been disconnected. 2- If the tool is not physically disconnected, check the tool cable.
4	Span fail.	1- Span value from torque sensor is outside bounds. 2 -Try once again to start the tool with no mechanical constraints. If the problem occurs again, contact your Desoutter representative for support
5	Offset fail.	1- Offset value from torque sensor is outside bounds. 2- Try once again to start the tool with no mechanical constraints. If the problem occurs again, contact your Desoutter representative for support.
6	Rotor locked	1-Unable to start tool motor (rotor is locked), change your tool 2-Contact your Desoutter representative for support
7	Motor too hot	1- Tool is locked because its maximum motor temperature has been reached. 2- Tool will remain locked until the motor temperature comes back to its normal value.
8	Tool angle fault	1- Problem detected with the tool angle sensor 2- The tool needs maintenance. 3- Contact your Desoutter representative for support
9	Tool invalid param	1- The tool memory cannot be read or is invalid. 2- The tool needs maintenance. If the problem occurs again, contact your Desoutter representative for support.
10	Tool calibration expired	1- The tool calibration date has expired. 2- A tool calibration procedure needs to be done to ensure the measurement accuracy.
12	Tool EEPROM error	1- The tool memory cannot be read or is invalid. 2- The tool needs maintenance. If the problem occurs again, contact your Desoutter representative for support.
13	Bad tool ground	1- Phase-phase or phase to ground shortcircuit. 2- Disconnect the tool. Contact your Desoutter representative for support.
14	Tq. power default	1- The torque sensor is not corrrectly supplied 2- The tool needs maintenance. If the problem occurs again, contact your Desoutter representative for support.
15	Tool lock on reject	1- The tool is locked forward after a NOK. 2- Unlock the tool in function of the "lock on reject option" selection i.e. by reversing, loosening or input.
16	Tool lock by OP	1- Tool has been locked by Open Protocol 2- Unlock the tool by sending an Enable tool message via Open Protocol
17	Loosening prohibited	1- Loosening is prohibited 2- The loosening is disabled in the Assembly action 3- The batch count type OK + NOK is used
18	Torque out of range !	1- The target torque value is above the tool max. torque. 2- Check Pset settings with tool characteristics.
19	Tool comm. error	1- Tool communication error. 2- Check tool and cable connections. If the problem occurs again, contact your Desoutter representative for support.
20	Tool light err.	1-Tool leds are not corrrectly supplied 2- Disconnect and reconnect the tool. If the problem occurs again, contact your Desoutter representative for support.
21	Max retries reached	1- The number of retries max has been reached. 2- The tool is locked. 3- The running Assembly Process has to be aborted.
22	Lock wait socket	1- The tool is locked, the controller is waiting for the correct socket to be lifted.
23	Unsupported tool	1- The tool connected to the controller is not supported. 2- Contact your Desoutter representative for more information.
24	Loos. prohib. XML	1- Loosening is disabled by VWXML protocol
25	Tight. prohib. XML	1- Tightening is prohibited by VWXML protocol
26	Tool maint. alarm n1	1- Tool maintenance tightening counter has been reached
27	Tool maint. alarm n2	1- Tool maintenance tightening counter has been reached
28	Battery tool version error	1 - Battery tool version and controller version are not compatible.
29	The battery is empty	1- The battery is discharged. The tool cannot tighten. 2- Recharge the battery.
30	The battery is low	1- The battery is low. 2- Recharge the battery.
31	Battery error	1- Abnormal battery voltage, the tool cannot tighten. 2- Recharge the battery. If the problem occurs again, replace the battery.
32	Tool display error	1- Board display malfunction. 2- Contact your Desoutter representative for support.
33	Tool time error	1- The tool time is not set correctly. The tightening results will not be time stamped. 2- Connect the tool to the controller to set date and time.

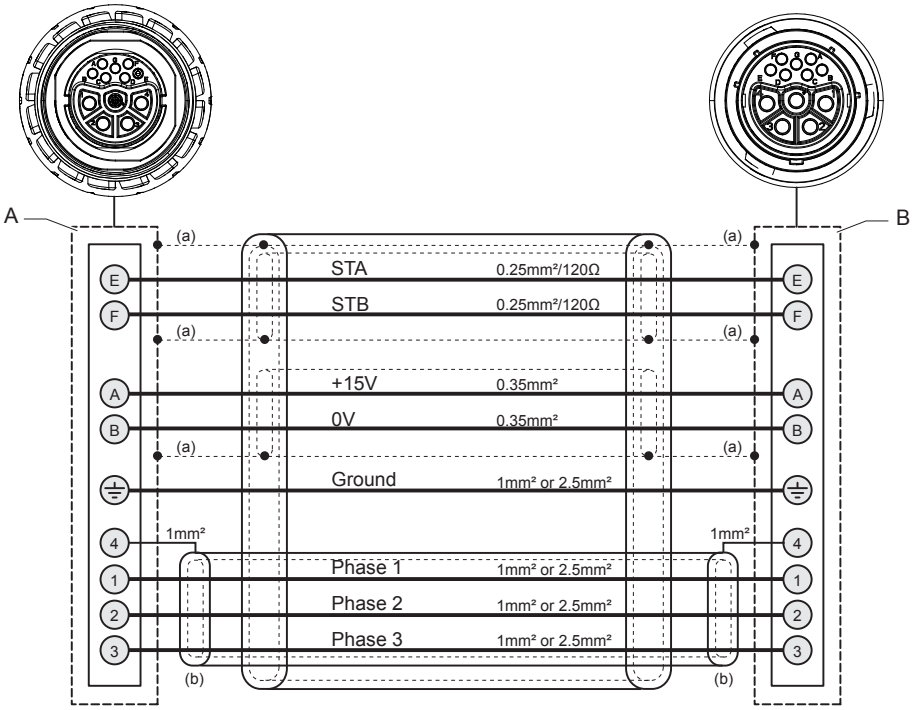
Code no.	Description	Resolution procedure
34	Tool mem. err	1- The tool memory does not work properly. 2- Contact your Desoutter representative for support.
35	Tool memory locked	1- The tool memory is locked to protect old data from rewriting. 2- Connect the tool to E-dock to retrieve old data.
36	Tool memory full	1- The tool memory is full. 2- Connect the tool to the controller to empty the memory.
37	Tool trig err.	1- The tool trigger does not work properly. 2- Check and clean the trigger. If the problem occurs again, contact your Desoutter representative for support.
38	Tool logs	1- Unexpected tool software exception 2- Log file has been generated by the tool 3-Contact your Desoutter representative for support
39	Tu config err	1- Tightening Unit settings are invalid
40	Tool over speed	1- Motor speed exceeds 130% of its maximum value. 2- Check tool parameters. 3- Wrong motortune parameters. Contact your Desoutter representative for support.
41	Unauthorized tool	1- The tool connected to the controller is not authorized (maximum number of battery tools reached). 2- Check the ePOD connection and capacity.
42	Tool locked by GeoLock	1- Tool has been locked by GeoLock 2- Unlock the tool by moving the tool in its defined area
43	Tubenut maintenance	1- Tubenut settings need to be reconfigured. Please, use CVI Monitor and refer to user's guide. 2- Contact your Desoutter representative for procedure
44	GeoLock learning mode ongoing	GeoLock learning mode ongoing
45	Anormal battery voltage	1- Anormal battery high voltage, check your battery. 2- This error can due to charger malfunction or end of life battery.
46	Anormal battery current	1- Anormal battery current consumption, check your PSet settings. 2- This error can due to speed settings.
47	Anormal battery behaviour	1- Anormal battery behaviour, check your battery. 2- If the problem occured again, change the battery with a new one.
48	Battery type not allowed	1- Battery type not allowed. 2- Change your battery type or your configuration.
100	Cable id invalid param	1- Invalid tool cable parameter, check that the tool cable is Desoutter certified 2- Contact your Desoutter representative for support
101	Cable id not detected	1- Tool cable communication error, check that the tool cable is Desoutter certified 2- Contact your Desoutter representative for support
102	Cable id not certif	1- Tool cable authentification error, check that the tool cable is Desoutter certified 2- Contact your Desoutter representative for support
199	Console activated	1- The serial console is activated. 2- Warning, this console is dedicated only to debug purposes and should not be used in production
200	Quick stop !	1- The quick stop has been activated 2- Check the Phoenix connector
201	Replace RTC battery	1- The real time clock backup battery needs to be replaced.
202	Fieldbus lost	1- Fieldbus connection with PLC is lost. - no heartbeat is received from PLC - the cable is broken or disconnected - the PLC is off line or not powered 2- Check the Fieldbus configuration.
204	Tool not validated	1- Tool locked by I/O. 2- Check the I/O settings: the "Tool validation" must be active to unlock the tool.
205	Torque settings	1-Invalid Torque setting, torque is greater than tool characteristics 2-Check Pset settings with the current tool characteristics
206	Speed settings	1-Invalid speed setting, speed is greater than tool characteristics 2-Check Pset settings with the tool max. speed.
207	Assembly done	1- Assembly Process is done, the tool is locked 2- Select new Assembly Process to unlock the tool
208	Invalid run reverse param	1-Invalid Run reverse setting, torque or speed are greater than tool characteristics or reverse strategy is not supported 2-Check Pset settings with the current tool characteristics
209	Pset invalid parameters	1- Fix errors of the selected Pset in CVI CONFIG. 2- Contact your Desoutter representative for support.
210	Invalid Pset selected	1- The Pset currently selected does not match the selectable one in the Assembly Process.
211	Invalid trigger conf	1- The tool currently connected to the CVI3 is not equipped with the trigger required by the tool trigger configuration 2- Adjust your tool trigger configuration to the tool connected or change the tool according to the expected trigger configuration
212	Result not stored	1- It was not possible to persist the tightening result in the controller 2- Contact your Desoutter representative for support
213	Drive Connect. Lost	1- Connection with the drive has been lost. 2- Reboot the controller. 3- If the issue remains, contact your Desoutter representative.

Code no.	Description	Resolution procedure
214	Short circuit	1- Serial peripheral default. 2- Disconnect and reconnect. 3- Check the serial peripheral.
215	Current calib. err.	1- Current calibration failed. 2- Try once again. 3- If the problem occurs again, contact your Desoutter representative for support.
216	Current high	1-Max current exceeded. 2-Contact your Desoutter representative for support
217	Drive disabled	1-Drive disabled by external source. 2-Contact your Desoutter representative for support
218	Drive power failure	1- Drive hardware failure. 2- Safety issue: contact your Desoutter representative for support
219	Trig. safety fail.	1- Drive hardware failure. 2- Safety issue. Contact your Desoutter representative for support.
220	Hardware trip	1- Drive hardware failure. 2- Safety issue. Contact your Desoutter representative for support.
221	Drive check err.	1- Drive hardware failure. 2- Safety issue. Contact your Desoutter representative for support.
222	Controller Too Hot	1- Heatsink too warm. 2- Let the controller cool down.
223	Drive init error	1- Software failure. 2- Restart the controller. 3- If the problem occurs again, contact your Desoutter representative for support.
224	IGBT too hot	1- Power electronics too warm. 2- Let the controller cool down.
225	Err. angle	1- Tool communication error. 2- Check tool and cable connections. If the problem occurs again, contact your Desoutter representative for support.
226	Err. torque	1- Tool communication error. Check tool and cable connections. 2- Try once again, if the problem occurs again, contact your Desoutter representative for support.
227	Motor stalled	1- Motor stalled (could be missing phase, wrong motortune or power electronics failure) 2- Try once again, if the problem occurs again, contact your Desoutter representative for support.
228	Drive err.	1- Software failure 2- Restart the controller. 3- If the problem occurs again, contact your Desoutter representative for support
229	Err. ctrl. loop	1- Software failure. 2- Restart the controller. 3- If the problem occurs again, contact your Desoutter representative for support.
230	DC bus high	1- Max current exceeded. DC-bus voltage high 2- Contact your Desoutter representative for support
231	DC bus too low	1- Power failure. DC-bus voltage low 2- Contact your Desoutter representative for support.
232	Err. ID fieldbus	1- The Fieldbus module plugged in the controller cannot be run. It is not an authorized Desoutter module. 2- Contact your Desoutter representative for more information.
233	CVINET FIFO full	1- The CVINet result FIFO is full, the CVINet connection has been lost 2- Check the CVI3 Ethernet cable 3- Check CVI3 Ethernet configuration 4- Check if CVINet is running correctly
234	Fieldbus mismatch	1-The Fieldbus module declared in configuration is not the same that the one present in controller (e.g. Profibus declared but a Profinet module in CVI3).
236	ToolsNet FIFO full	1- The ToolsNet result FIFO is full, the CVINet connection has been lost 2- Check the CVI3 Ethernet cable 3- Check CVI3 Ethernet configuration 4- Check if ToolsNet is running correctly
237	Invalid data	1- The Fieldbus mapping has too many items.
238	Invalid address	1- The device address affected to Fieldbus is invalid.
239	Invalid com settings	1- Fieldbus communication settings are invalid
240	XML not authorized	1- The selected XML protocol is not authorized (check the ePOD characteristics)
241	CVINet FIFO alarm	1- The CVINet result FIFO has reached alarm threshold, the CVINet connection has been lost 2- Check the CVI3 Ethernet cable 3- Check CVI3 Ethernet configuration 4- Check if CVINet is running correctly
242	ToolsNet FIFO alarm	1- The ToolsNet result FIFO has reached alarm threshold, the CVINet connection has been lost 2- Check the CVI3 Ethernet cable 3- Check CVI3 Ethernet configuration 4- Check if ToolsNet is running correctly
243	PFCS not authorized	1- The selected PFCS protocol is not authorized (check the ePOD characteristics)
244	Accessory disconnected	1- The accessory at the given address has been disconnected from the eBUS of the CVI3. 2- Check the accessory cable.
245	Wait PLC ack	1 - Tool is locked until PLC has acknowledged the result in Fieldbus

Code no.	Description	Resolution procedure
246	Synchro I/O problem	1- Error detected on synchronisation input 2- Check the configuration of I/O 3- Check the synchronisation cable
247	XML version conflict	1- Conflict detected in Audi / VW XML protocol version. 2- Check the coherence of the version between the controller and master PC/PLC
248	SAS order failed	1- Fieldbus SAS order has failed. 2- Check the value of RRGI, SIO, etc.
249	XML PRG 0	1- The PRG value 0 has been set by Fieldbus.
250	Pset corrupted	1- Pset is not defined correctly 2- Check the Pset
251	No Pset selected	1- No Pset is selected 2- Select a Pset before start order
253	Incorrect tool Id	1- Pset is not defined correctly. 2- One tool declared in the Pset is not part of the tightening unit 3- Check the Pset.
254	Drive comm. error	1- Error detected in drive communication 2- Restart the controller 3- If the problem occurs again, contact your Desoutter representative for support
255	Drive choke too hot	1- Power electronics too warm. 2- Let the controller cool down.
256	Motor too hot	1- Tool is locked because its maximum motor temperature has been reached. 2- Tool will remain locked until the motor temperature comes back to its normal value.
257	Remote start error	1- Verify the tool trigger is correctly pushed
258	Calibration need Pset mode	1- For tool calibration, the Tightening Unit has to be in Pset mode 2- Change the Tightening Unit mode into Pset mode.
259	Reset input active	1- "Reset" input is active 2- The Tightening Unit will unlock when input switchs to inactive state.
260	IPM not authorized	1- The selected IPM protocol is not authorized (check the ePOD connection)
261	Locked by IPM	1- IPM protocol has locked the controller 2- Check the connection with the IPM gateway 3- Check CVI3 IPM configuration
262	OP connect. lost	1- Open protocol connection has been lost
263	Socket tray conflict	For this Tightening Unit, do not associate more than one socket combination to a Pset
264	Too many steps	Check that an Epod3 is connected to the controller to enable more steps per pset
310	Id OK :	1- An identifier has been received and accepted. 2- The identifier is matching an Assembly process start condition
311	Id NOK :	1- An identifier has been received 2- The identifier does not match any Assembly process start condition
312	Access expired	1- The access rights on the USB key cannot be read 2- Unplug the key and insert it again 3- If the issue is persistent, the access right file is probably corrupt 4- Contact your CVI Key administrator.
313	Access invalid	1- The access rights on the USB key could not be read 2- Try unplugg the key and insert it again 3- If the issue is persistent, the access right file is probably corrupt contact your CVI Key administrator
400	Default Ntwk Cfg	1- Network configuration has been set to default.
401	Ntwk Cfg Error	1- Network configuration failed. 2- Check your settings. 3- If the problem occurs again, contact your Desoutter representative for support.
500	CVILogix user info	Message generated by CVILOGIX program
501	CVILogix user info	Message generated by CVILOGIX program
502	CVILogix user info	Message generated by CVILOGIX program
899	Downgrade not allowed	1- The SW downgrade is not allowed for this version 2- Check the CVI3 image version on your USB key 3- If the update is still failling, contact your Desoutter representative
900	SW update failed	1- The SW upgrade failed 2- Do not remove the USB key and try to restart the CVI3 3- If the upgrade is still failing, contact your Desoutter representative
901	SW not found	1- The SW upgrade failed, no CVI3 image (*.cvi3) was found at the USB key root directory 2- Check your USB key, it must have only one CVI3 image
902	SW invalid	1- The SW upgrade failed, the CVI3 image copied on your USB key is corrupted 2- Remove and copy again your CVI3 image 3- Try another USB key 4- Contact your Desoutter representative for more information
903	SW updater missing	1- The SW updater is not available or broken 2- Contact your Desoutter representative for more information
904	Backup disabled	1- The save parameters utility is not available 2- Contact your Dessouter representative for upgrade
905	USB key full	1- Your USB key is full, all data were not saved 2- Delete your old backup files and try again

Code no.	Description	Resolution procedure
906	Save param. failed	1- An error occurred during backup, data were not saved. 2- Check the available space on your key, delete files and try again. 3- If the problem persists, contact the Desoutter support team.
907	Wrong USB port	1- Your USB device is plugged into the wrong port 2- If your device is a USB key, plug it into the USB front port 3- If your device is a USB barcode reader or keyboard, plug it into the bottom USB ports
908	Too HID device	1- Too many USB devices (barcode reader or keyboard) are plugged to the controller 2- Remove all devices and plug them again to the bottom USB ports only.
909	HID device err	1- Your USB device is not supported by the CVI3 controller 2- Only USB barcode reader and USB keyboard are supported, if you use one of them, contact your Dessouter representative for upgrade
910	Save prg error	1- Plug a USB key to the front panel. 2- Check available space on your USB key, delete some old backup and try again.
911	Load prg error	1- Plug a USB key to the front panel. 2- The .zip file was not found, check that it is in the correct directory.
912	Backup failed	1- Check the ePOD connection. 2- Contact your Desoutter representative for support.
913	Restore failed	1- Check the ePOD connection. 2- Contact your Desoutter representative for support.
914	Maintenance ongoing	Maintenance ongoing: Refer to user manual
915	Inconsistent version	1- The SW version of all CVI3 controllers must be identical 2- Update firmware
916	Workgroup not authorized	1- You need to connect an epod3 on the Workgroup Primary controller
917	Acc conf err	1-The accessory configuration is not correct 2-Check type of elements and events associated
918	Emergency stop !	1- The emergency stop has been activated 2- Check the M8 connector

1 - TOOL CONNECTOR

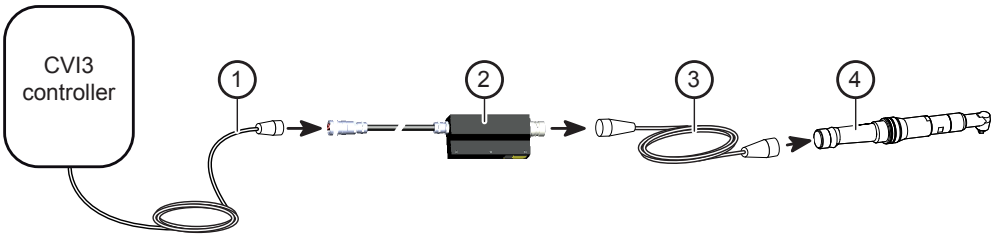


Legend
A Connector 12 pts Male
B Connector 12 pts Female
a Ground shielded cable
b WARNING : Shielded insulate

STA	Twisted pairs: 2x0.25 mm² at 10 MHz 65 Ω
STB	

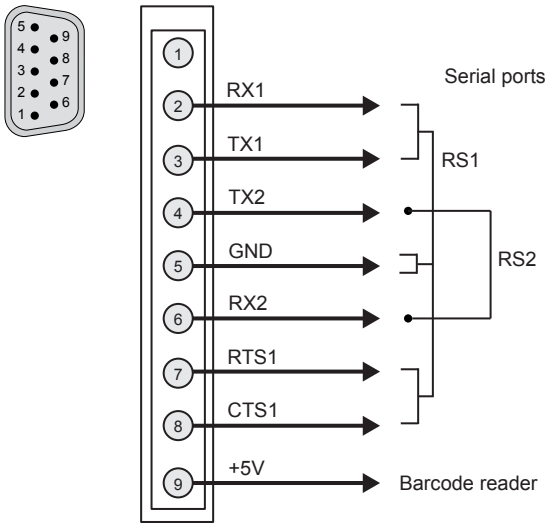
Cable	Color
STA	Red
STB	Red / Blue
+15V	Black / Blue
0V	Black
Ground	Yellow / Green
Phase 1	Black
Phase 2	Brown
Phase 3	Blue

2 - CVI II ADAPTOR

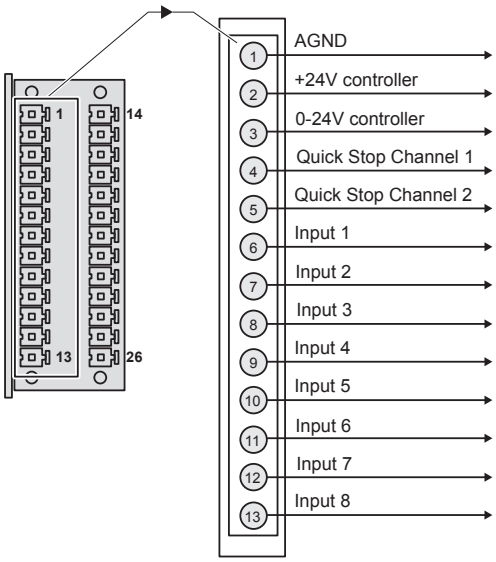


Legend
1 CVI3 tool cable
2 CVI II tool adapter
3 CVI II cable
4 CVI II tool

3 - RS232 - SubD 9pt

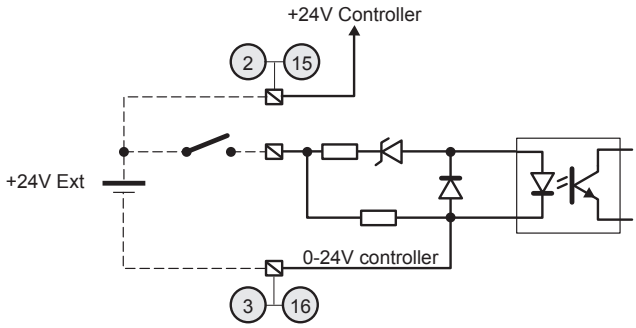


4 - DIGITAL INPUTS (0 – 24V)

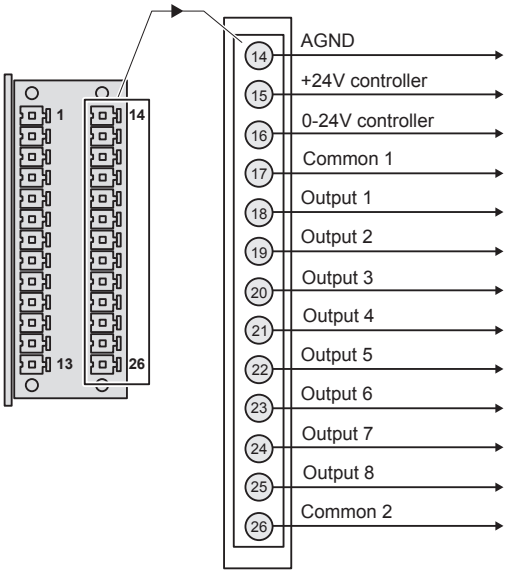


Example of connections:

Possibility to connect a 24V external supply in parallel of the 24V delivered by the controller:

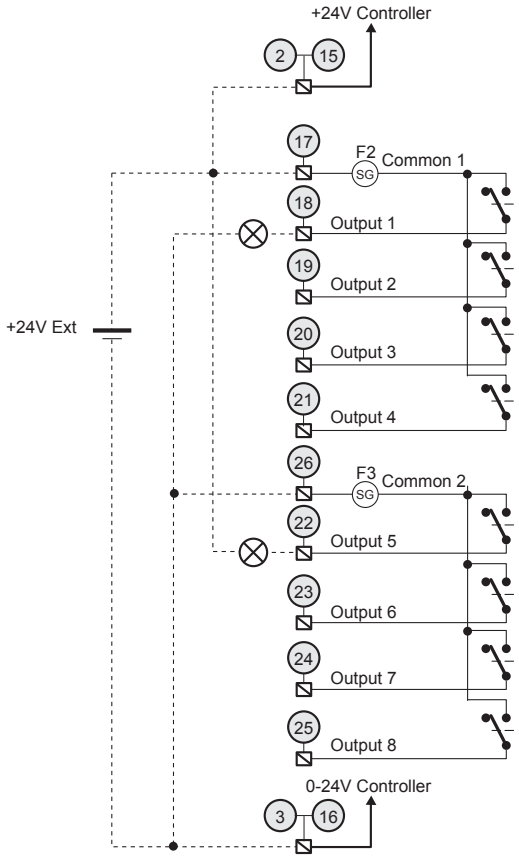


5 - DIGITAL OUTPUTS (0 – 24V)



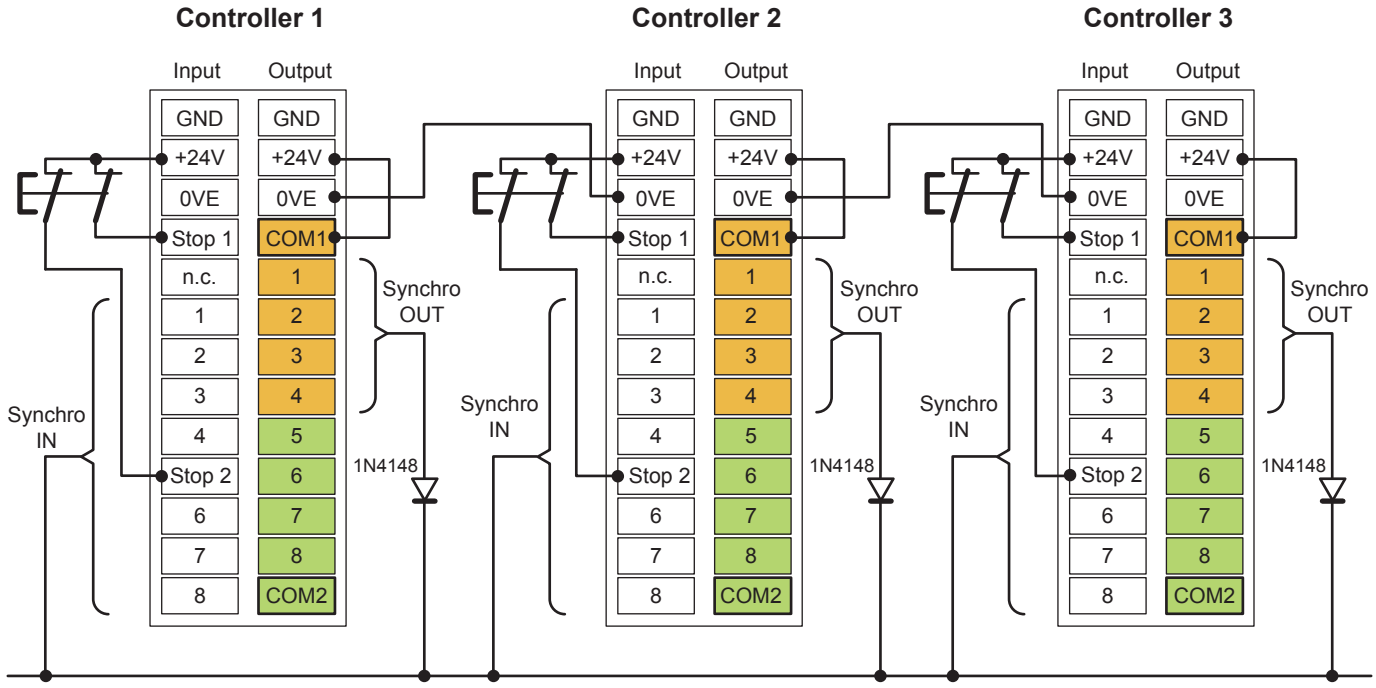
Example of connections:

Possibility to connect a 24V external supply in parallel of the 24V delivered by the controller:



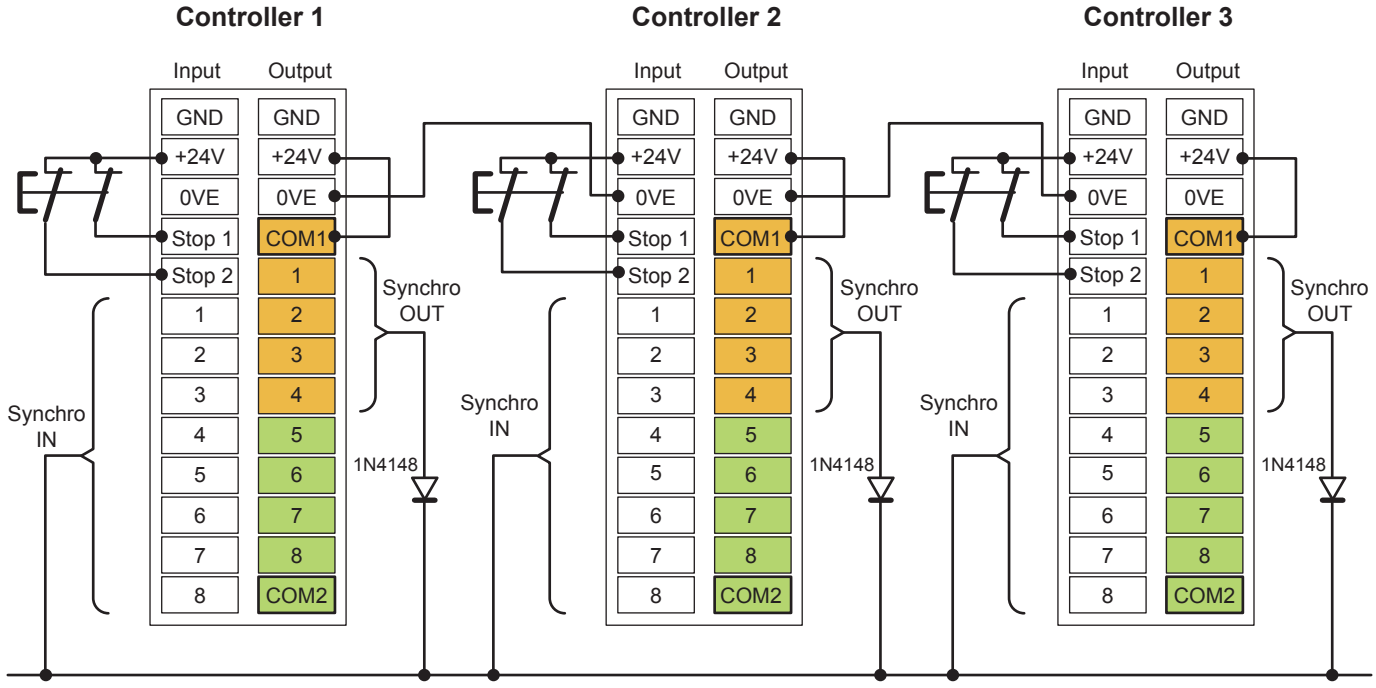
6 - SYNCHRONIZING SEVERAL CVI3 VISION CONTROLLERS

It is necessary to wire a diode 1N4148 in serial with each synchro out signal.

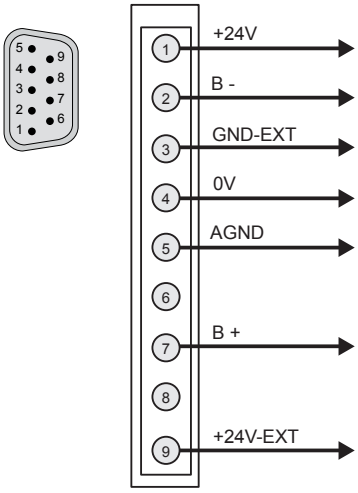


7 - SYNCHRONIZING SEVERAL TWINCVI3 CONTROLLERS

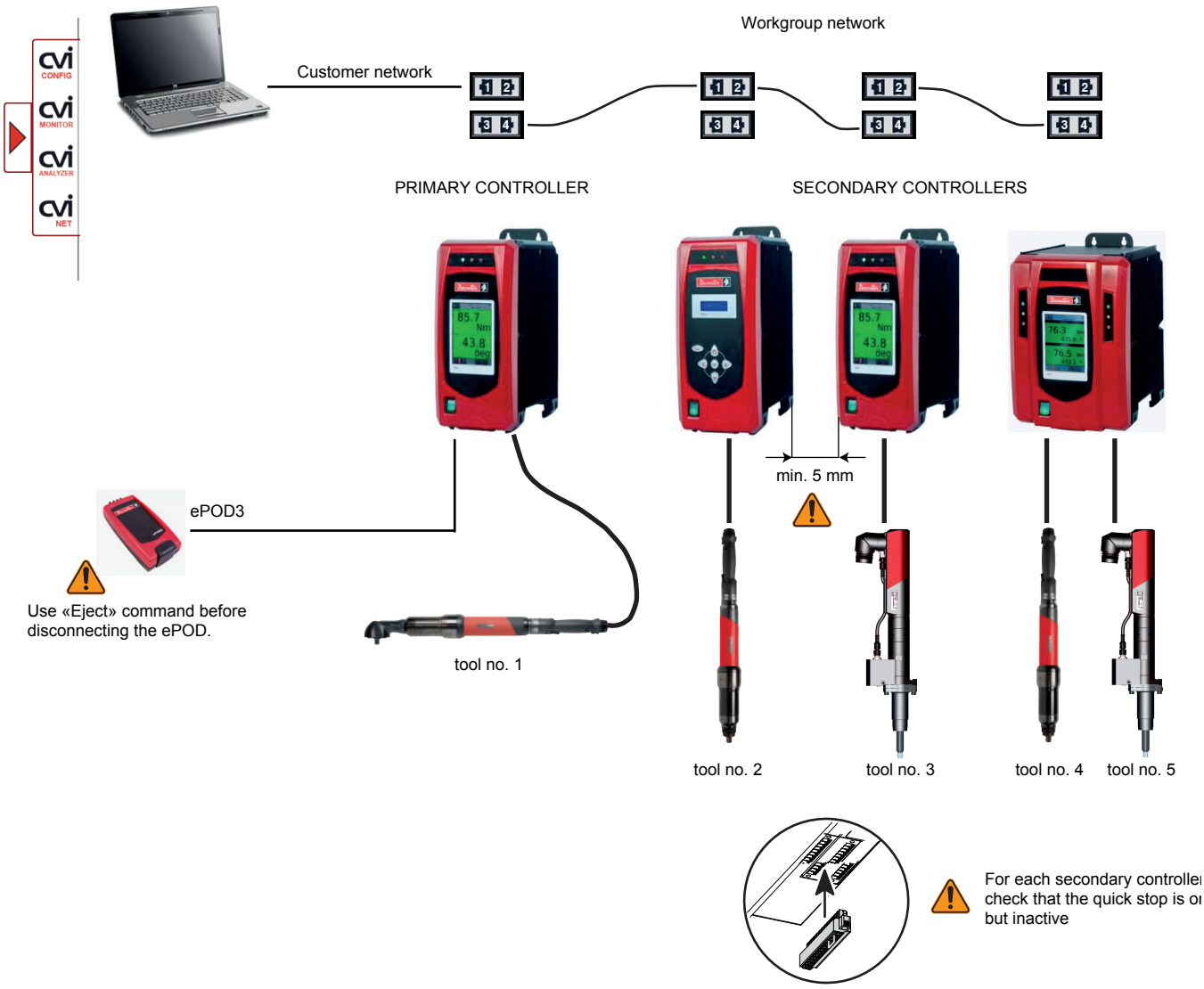
It is necessary to wire a diode 1N4148 in serial with each synchro out signal.

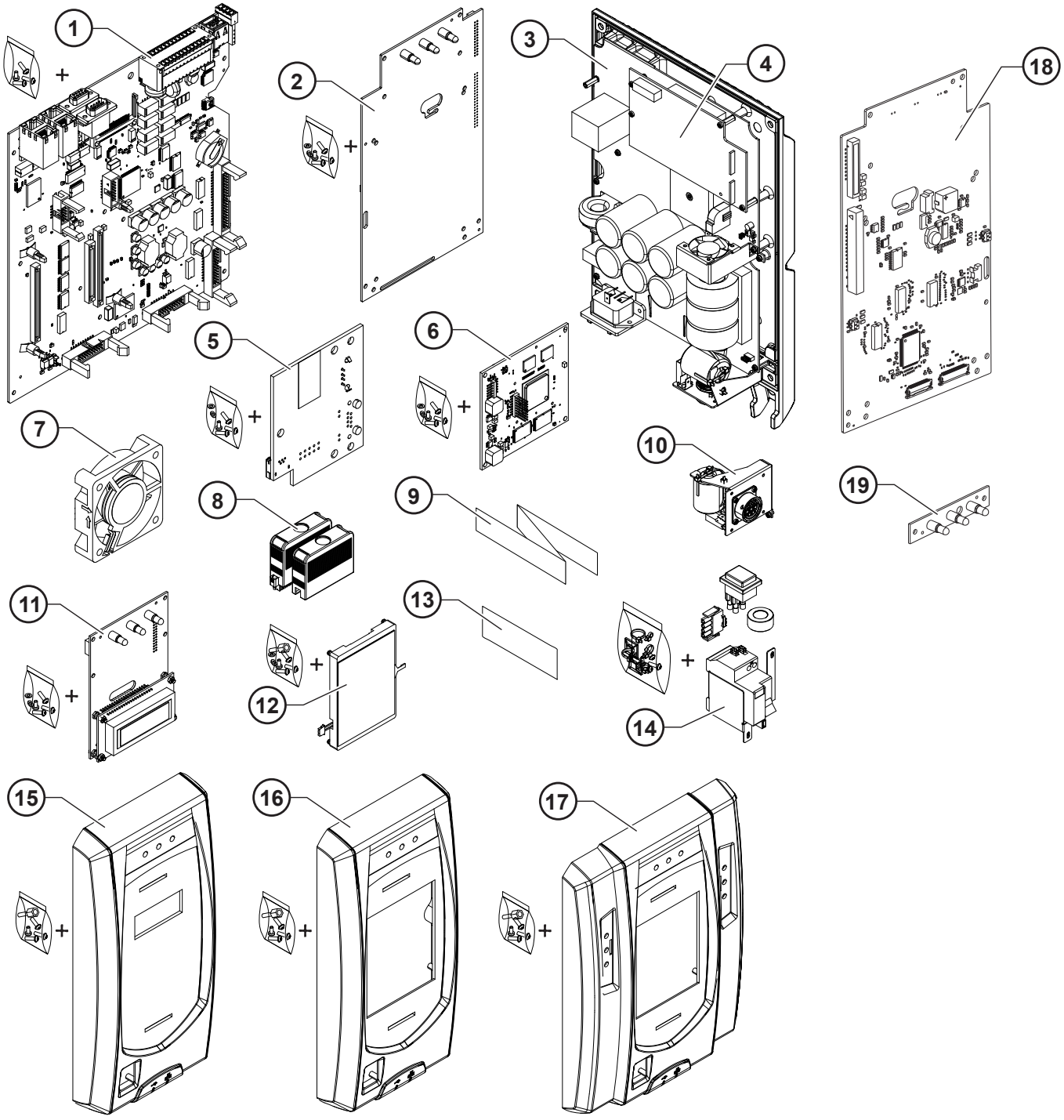


8 - eBUS (for accessories)



9 - WORKGROUP




1
2
3
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18
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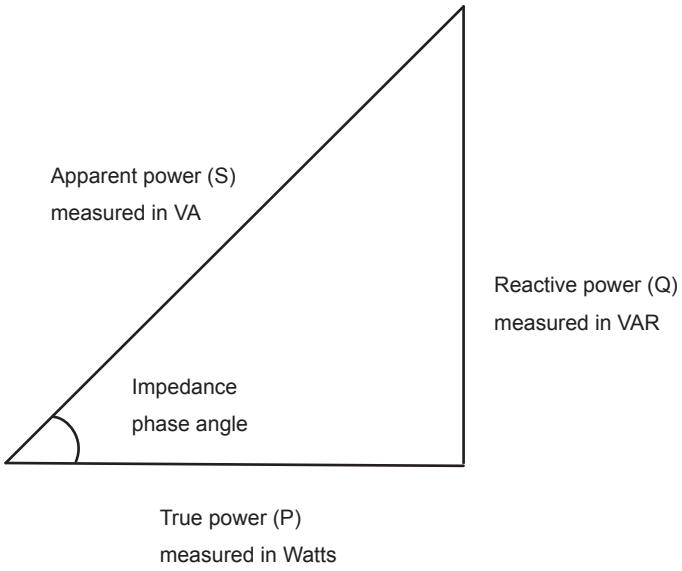
Item	Ref.	Designation
1	6159188835	Interface board including screws
2	6159188535	Display board for CVI3 Vision including the display and screws
3	6153972145	Complete drive board on the heatsink
4	6159188985	TPLC board
5	6159188825	Ethernet board including screws
6	6159188895	CPU board including screws
7	-	Drive board fan
8	6159285025	I/O connector kit
9	-	Flat cable for Interface board / Drive board connection
10	6159380555	Tool connector kit
11	6159188815	Display board for CVI3 Function including support and screws
12	6155731435	CVI3 Vision display including screws
13	2050478153	Warning label
14	6159159865	Earth fault circuit breaker including GFI switch, wiring kit and screws
15	6155731425	CVI3 Function front panel including screws
16	6159235285	CVI3 Vision front panel including screws
17	6155731455	TWINCVI3 front panel including screws
18	6159188545	Display board for TWINCVI3 including screws without the display
19	6159190125	Board LED TWINCVI3 including screws

The “Power triangle”



P = true power $P = \frac{1}{T}\int_0^T u(t) \times i(t)dt$ measured in units of Watts

where T is the period of the signal

On a CVI3, the Power peak is 5kW.

To dimension an installation, the apparent power consumption is the only needed information.

S = apparent power

$$S = U_{rms} \times I_{rms}$$

measured in Volt-Amps (VA)

The apparent power peak is 6kVA the duration of the peak is < 0.5 s
The mean apparent power is always ≤ 1 kVA.

SINGLE PHASE 230 V

At 230 V

$$\rightarrow I_{rms} \times \frac{230}{\sqrt{2}} \leq 1\ kVA$$

$$\rightarrow I_{rms} \leq 1000 \times \frac{\sqrt{2}}{230}\ A$$

$$\rightarrow I_{rms} \leq 6.15\ A$$

Then we recommend to use a circuit breaker 10A Curve D

At 110 V

$$\rightarrow I_{rms} \times \frac{110}{\sqrt{2}} \leq 1\ kVA$$

$$\rightarrow I_{rms} \leq 1000 \times \frac{\sqrt{2}}{110}\ A$$

$$\rightarrow I_{rms} \leq 12.85\ A$$

Then we recommend to use a circuit breaker 20A Curve D

APPENDIX B - JVL6-32 RESIDUAL CURRENT CIRCUIT BREAKER WITH OVER-CURRENT PROTECTION

The CVI3 has a JVL6-32 residual current circuit breaker with Over-current Protection.

The residual current circuit breaker must be tested monthly.

It provides protection against earth leakage faults (30mA), overloads, short-circuits and Over-current in your installation (I=16A. see curve).

The Over-current protection of the JVL6-32 uses “D” tripping characteristics

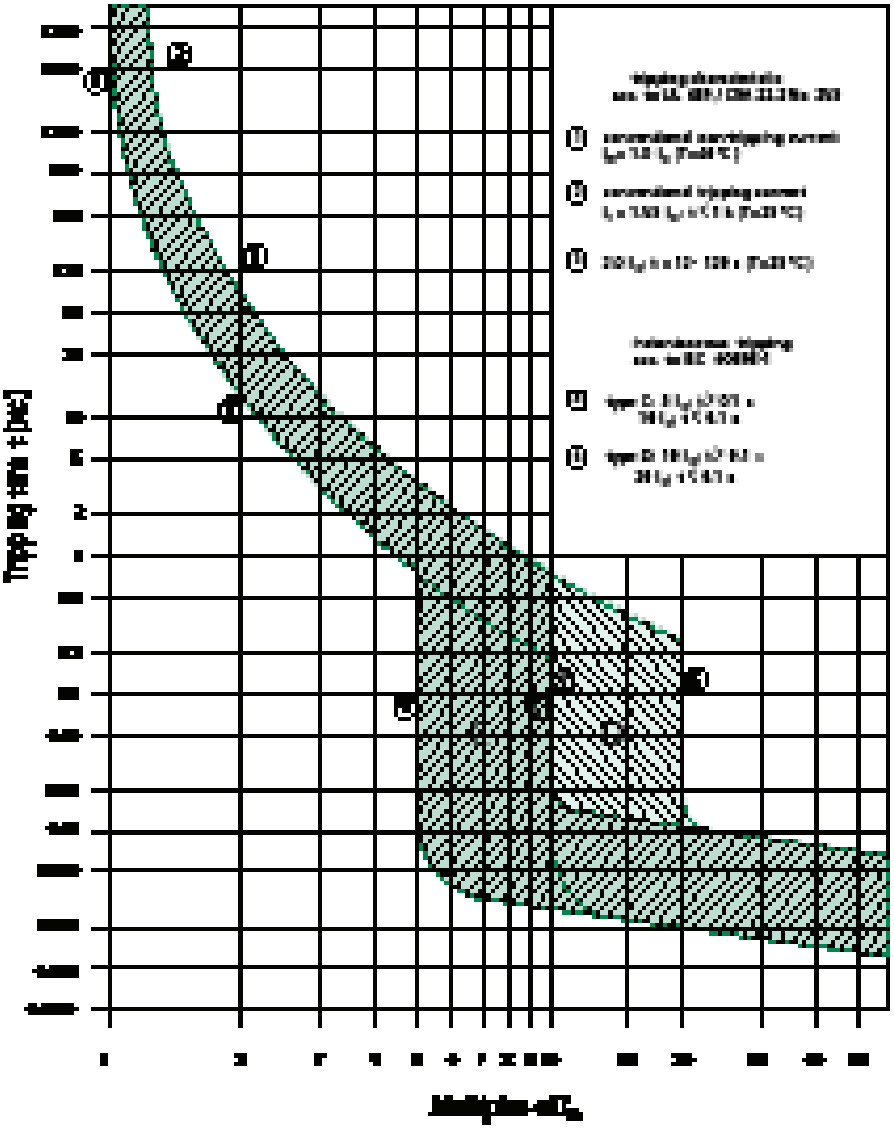


FIGURE 1 – CURVE C AND D

APPENDIX - ePOD

The ePOD unlocks a specified level of functionality and acts as a back-up unit for the configuration of the CVI3 controllers.
It also increases the number of results, curves and logs in the controller.
There are different models of ePOD and specific ePOD designed for some specific protocols.

Model	**ePOD1**	**ePOD2**	**ePOD3**
Part number	6159360750	6159360760	6159360770
Backup			
Complete backup of the controller system	included	included	included
Results storage			
Number of Pset results	-	20,000	20,000
Number of curves per tool	-	50	50
Number of Pset versions per Pset	-	20	20
Number of events in the event log	-	1,000	1,000
Basic functions			
Number of steps per Pset		-	-
CVILOGIX runtime license		included	included
Programming / Supervision / Controller backup			
Results storage	-	included	included
Psets and Assembly Processes storage	-	included	included

ePOD1

ePOD1 is a backup module for the controller result and configuration database.

- It can be used as real time backup module. In this case the ePOD1 must always be plugged to the controller.
- It also can be used as a manual backup that stores the configuration database, the results database and the firmware version of the controller. ePOD1 gets a snapshot of the controller.

ePOD2

ePOD2 has all functionalities of ePOD1.

- It also increases the amount of data stored in the controller.
- ePOD2 activates CVILOGIX (Embedded Programmable logic controller –PLC- of CVI3 controllers).

ePOD3

ePOD3 has all functionalities of ePOD2.

- ePOD3 activates the workgroup configuration.

More Than Productivity

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